# Foresight Brief

The *Foresight Brief* is a publication from the European Trade Union Institute (ETUI) focused on strategic thinking about the future challenges for the world of work. It is produced by the ETUI's Foresight Unit, whose work concentrates on two priority areas: climate change adaptation and new technologies. The *Foresight Brief* is also available in French under the title *Notes de prospective*.

# The mirage of the end of work

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Will technological progress lead to a world without work? The debate on the 'end of work' is currently climbing back up the news agenda following a number of alarmist forecasts about the number of jobs that will be destroyed by digitalisation. The technological optimism underlying these forecasts is somewhat naïve, however, and ignores the societal dimensions inherent to the spread of innovations. It also reveals a simplistic understanding of work itself, which is more than simply a set of tasks that could be performed (to a greater or lesser extent) by intelligent machines. Work is the product of organisational choices and power relations, and it provides individuals with a place in the society in which they live and recognition by its members; this means that thinking about the work of tomorrow also means thinking about its importance for society at individual and collective levels. Finally, technology is less likely to replace work than to move it elsewhere – not only up or down the links of the relevant value chain, but also among occupations and among employment statuses. What we need to worry about is not a world without work, but a world where employment relations have withered away.

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A recent wave of innovation in a number of different fields – intelligent and learning machines, big data algorithms and the development of online platforms – has pushed the debate on the 'end of work' back up the news agenda. If machines become capable of carrying out an ever-wider range of the tasks which are currently carried out by humans, will they take work away from these humans or force them to seek out jobs which involve different tasks? What will work mean in the world of tomorrow?

## The end of work – remixed

The concept of the 'end of work' is not a new one. Marx believed that the amount of time spent on salaried work would automatically reduce as productive forces developed and technology advanced, and that this would help emancipate the workers. In 1930, Keynes predicted that a 15 hour working week would be enough to allow the workers of 2030 to make a good living. From the early 1980s onwards, Gorz added a further dimension to the 'end of work' debate by drawing a distinction between the 'constrained work' performed for wages in the heteronomous sphere, where essential goods and services are produced, where market rules hold sway and where productivity can increase, and the 'free work' carried out in the autonomous sphere, where the needs and ambitions of the individuals performing the work are what determine the end goals and the way of working. As novel technologies are developed and productivity increases, people will need to spend little or no time in the heteronomous sphere, with a countervailing increase in opportunities in the autonomous sphere (Gorz, 1988). In this paradigm, it is only the end of heteronomous work that is close at hand.

The arguments advanced by participants in the current debate on the end of work are shaped by different schools of thought, and often fail to discriminate between the development of work as a social activity carried out by humans and the development of salaried work as an organising principle of socioeconomic systems.

The imminent and inevitable replacement of human labour – not only repetitive tasks (both manual and intellectual) but also an ever-growing proportion of cognitive tasks – by machine labour, performed by a new generation of AI systems and learning machines, has been heralded in many recent publications, including a number of US bestsellers (Brynjolfsson and McAfee, 2014; Ford, 2015). Exponential performance gains in the field of digital technologies mean that the gap between human and machine capabilities is growing smaller every day; in Ford's opinion, the myth of full employment is a thing of the past, whereas Brynjolfsson and McAfee believe that the human workforce responsible for producing wealth in the society of the future will be very small, but that machines will struggle to compete with humans when it comes to enhancing people's well-being.

This idea was put forward by Rifkin 20 years ago in his 1995 book entitled *The End of Work*, and is therefore far from new. This book contains many examples of human jobs which are gradually being taken over by digital technologies – not only in the fields of agriculture and manufacturing, but also in the fields of commerce and public services. Rifkin takes this to mean that job numbers in the majority of industrial sectors will plummet in

developed countries over the next 10 or 20 years and that the number of new jobs emerging in high-tech fields will be inconsequential in comparison, but argues against the idea of a world without work on the grounds that work serves as a driver of social integration and a source of identity. He therefore believes the time available to people who have lost their jobs owing to the reduction in salaried work should be filled with care-related activities in a non-commercial, non-private and non-public third sector in return for a substitute income or 'social salary', and calls for a transition towards a post-market society centred around new ways of working and new ways of distributing income. Rifkin's arguments have one fatal flaw, however; between 1995 and 2015, total employment rose continuously both in the OECD countries and in the world as a whole, meaning that his employment-related predictions have not been borne out by the facts – despite the 2008 financial crisis and even allowing for the fact that an increasing proportion of jobs are part-time or precarious in nature.

Rifkin's post-market society and Gorz' autonomous sphere are significant not so much because they lend credence to the notion of a world without work, but because they raise questions about the precise nature of this work and the boundaries between paid and unpaid work, between formal and informal work, and between creative and productive activities carried out 'at work' and those carried out elsewhere – boundaries which will be blurred by digitalisation. According to Flichy (2017), digitalisation will lead to a blossoming of 'making' and 'open work', or in other words a broad spectrum of activities which allow people to get active, creative or involved outside the formal world of work – ranging from do-it-yourself to volunteering in the non-profit sector and skill-swapping networks – which many individuals find more conducive to personal growth than jobs which are increasingly standardised and dehumanised. The link between digitalisation and open work (as either a supplement to salaried work or a replacement of it) is that the former supplies tools which support and enhance the latter; the likely outcome of this process is therefore not the end of work, but a gradual decline in its presumed and actual importance as it becomes just one of many different ways of 'making'.

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Another perspective on the debate concerning the end of work can be gained by examining the arguments advanced in recent years by proponents and opponents of an unconditional basic income or universal allowance; the former often cite the imminent arrival of a world without work to bolster their case, and refer to job loss predictions and the growth in precarious employment as reasons why a basic income should be introduced. It should come as little surprise that these arguments are reminiscent of those put forward in the literature on the end of work, since Gorz was one of the first to suggest the idea of a universal allowance, and Rifkin's social salary is nothing other than a modified version of the basic income. Although Brynjolfsson and McAfee are mostly silent on the topic of social policy, they

come out in support of a negative income tax such as that proposed in the 1980s by Friedman and the Chicago School, i.e. the basic income in its most neoliberal guise. The link between digitalisation, the end of work and the basic income is significant, and we will return to it later in this paper.

## Digital technologies – the hype and the reality

Vast amounts of ink (virtual or otherwise) have been spilled on the unprecedented performance of the latest generation of digital technologies, but these claims must be taken with a pinch of salt. The digital revolution has been under way for almost 40 years, which means that the current upheaval is not a new technological revolution, but the rocky and awkward transition between the installation and deployment periods of an ongoing one (Perez, 2010; Valenduc, 2018). There is a general feeling that something is gearing up, but it is hard to say exactly what it is – technological progress, the spread of innovations or increases in productivity?

One of the tropes commonly found in the literature on digitalisation and the end of work is that of exponential (and never-ending) increases in technological performance, based on a misinterpretation of Moore's Law. Formulated back in the 1980s as a mathematical rule to explain the miniaturisation of microprocessors, Moore's Law suggests that the number of transistors on a chip will double about every two years, but has been extrapolated by various authors (Rifkin, 2014; Brynjolfsson and McAfee, 2014; Ford, 2015) to all developments in the digital field, including big data, artificial intelligence, algorithmic power, network capacity and so on. There is a widely held assumption that these increases can be infinite and limitless, sidestepping the parallel increases in the collateral damage caused by digital technologies (consumption of electricity, depletion of rare minerals, production of electronic waste, etc.). It may not be unreasonable to compare the situation today with that in the 1950s and 1960s, when it was commonly believed that oil and uranium resources were as good as infinite and any collateral damage barely worth thinking about.

The implicit assumption underlying many of the forecasts which talk about the impact of digitalisation is that technological innovations are available instantly, everywhere and for everyone as soon as they leave the metaphorical factory gate, overlooking the fact that the dissemination of innovations through the economy and society is governed by complex processes. Two key points should be noted in this respect.

Firstly, the rate of adoption currently varies greatly for individual innovations. People like to cite the smartphone as an example which proves that the pace of diffusion is accelerating, since it took less than 10 years after it was unveiled to the world by Apple in 2007 for it to become a ubiquitous part of home and business life. In reality, however, the explanation for this rapid adoption by the masses lies in the convergence of a number of different innovations, many of which boast much slower rates of dissemination; they include geolocation (the first portable GPS devices appeared in 1991), mobile Internet (20 years passed between the first time that data was transmitted using the GSM protocol and the roll-out of 4G networks) and mobile applications (the Java programming language was made available online in

1995), not to mention the fact that mobile telephony has a long history which is littered with successes, failures and shifting alliances, and which can be traced back to initial experiments in the 1980s. The smartphone example thus reveals that synergistic factors play a key role in innovation, and that interactions between stakeholders in the technology sector, the economy and the institutional world exhibit marked path dependency.

Secondly, the process through which each new generation of technologies is adopted is a gradual and uneven one, during which certain industrial sectors, geographical areas or companies (large or small) forge ahead while others lag behind, and during which the details of legal and institutional regulation need to be thrashed out. Optical barcode scanning in the retail sector is a case in point; although the technology was ready to go in 1985 or thereabouts, it took almost 20 years for this innovation to achieve optimum economic efficiency owing to protracted negotiations between all the commercial, institutional and technical players in the global supply and distribution chains – manufacturers, retail middlemen, standardisation agencies, the transport and logistics sector, retail outlets and bodies responsible for monitoring QA and traceability procedures. These legal and institutional problems are compounded by disparities in national and regional innovation policies, which can also speed up or slow down the rate of diffusion and adoption, implying that the spread of innovations is determined by societal factors rather than simply the speed at which technological performance improves.

> The assumption that technological innovations are available instantly, everywhere and for everyone as soon as they leave the metaphorical factory gate overlooks the fact that the spread of innovations through the economy and society is governed by complex processes.

The above arguments notwithstanding, there is indeed a high probability that innovations are now spreading at an ever-faster pace. Synergies between individual innovations are facilitated by an improved flow of scientific and technical information around the world, and everyone involved in bringing innovations to market has a better grasp of the institutional, legal and political obstacles. This acceleration also ties in with the aforementioned hypothesis that we are currently transitioning between the installation and deployment periods of the digital revolution.

Attention must also be paid to the issue of productivity, since there is a considerable discrepancy between the productivity statistics advertised for the individual digital technologies by themselves and the productivity increases actually measured when they are incorporated into real-life applications. After all, productivity is a macroeconomic aggregate measured in value rather than in gigabits, and calculated at the level of the economy as a whole rather than individual innovations. By way of contrast to previous waves of technological innovation, a positive correlation between digitalisation and increased productivity is not universally accepted (Valenduc and Vendramin, 2016, pp. 15-17); the OECD countries have invested a great deal of money into innovation over the past 20 years, but their productivity has risen very little. There are a number of reasons why this might be the case – one is that the creators of technological innovations tend to underestimate not only the

length of time between market launch and optimum efficiency but also the level of organisational change required within companies, another is that current methods for measuring productivity are perhaps a poor fit for an economy which is becoming less tangible by the day and for new business models such as the platform economy, and yet another is that the literature on the digital revolution fails to distinguish between productive efficiency in performance-related terms and productivity in economic terms. Be that as it may, uncertainty still reigns over the level of productivity increases to be expected from new-generation digital technologies (Soete, 2018).

## Will jobs be replaced by intelligent machines or simply transformed?

The range of current forecasts for the impact of digitalisation on jobs is very broad; the most pessimistic fuel the debate on the end of work by predicting that around 50% of jobs will be highly susceptible to replacement within the next 15 or 20 years (Frey and Osborne, 2013), whereas the most optimistic suggest that only around 10% of jobs will be at risk, with another 50% undergoing radical changes but nevertheless continuing to exist (Arntz, Gregory and Zierahn, 2016), and other recent studies also shunning pessimism and containing figures which are somewhere between these two extremes. These wildly varying forecasts are attributable to significant differences in the way in which the authors of these papers analyse the relationship between technology and work transformations and how they define the content of work and the shape of occupations (Le Ru, 2016; Valenduc, 2017). It is therefore useful to take a closer look at the guiding principles which underpin these studies (see Table 1).

The study by University of Oxford researchers Frey and Osborne focuses in particular on two fields of technology – learning machines and mobile robotics – and is therefore predicated on the opinions of AI and robotics experts and the extent to which they think human work will be substituted by machines, using the Standard Occupation Classification (SOC) system of the US Bureau of Labor Statistics as a basis. The authors advance the hypothesis that the exponential increases in the performance of digital technologies we are seeing mean that there is a very real prospect of tasks being replaced by IT applications or robots over the next one or two decades – and not just routine, manual or intellectual tasks, but also non-routine tasks which involve a significant cognitive or intuitive component. Nevertheless, the authors acknowledge that the potential for job automation is limited by 'engineering bottlenecks', or in other words tasks which human beings are (as yet) more skilled at performing than technology, and which fall under three different headings: unstructured or unpredictable perception and manipulation tasks in atypical, cramped or messy environments, creative intelligence tasks where robots can enrich human creativity without replacing it, and social intelligence tasks, which include the relational or emotional work of negotiating, persuading, providing personal care and engaging in non-codifiable conversations. Having established the above, the authors calculate the probability of human work to machine substitution based on the relative proportions of

Table 1 **The link between technology and work – assumptions underlying the predicted impact of digitalisation on jobs over the next one or two decades**

| Authors | Method used to estimate the potential for machine substitution | Level at which changes in work are analysed | Criteria used to define the threat | Sources of data | Main findings |
|---|---|---|---|---|---|
| Frey and Osborne (2013) | Opinions from IA and robotics experts on tasks susceptible to robot substitution and engineering bottlenecks. | **Occupations**. Tasks carried out within occupations are deemed to be homogeneous. | Probability of the occupation being replaced by machines ≥ 70%. | Standard Occupation Classification (SOC) system of the US Bureau of Labor Statistics, (BLS) + description of tasks from O*Net. | USA: 47% of jobs highly susceptible to substitution. |
| Arntz, Gregory, Zierahn (OECD, 2016) | Opinions of experts and bottlenecks according to Frey and Osborne. | **Jobs** in different occupations. Jobs within the same occupation are heterogeneous in nature, and combine tasks with a high or low susceptibility to substitution. | Probability of the job being replaced by machines ≥ 70%. | SOC system mapped to ISCO classification. Individual worker competencies according to PIAAC data (21 OECD countries). | USA: 9% of jobs at risk of substitution. OECD: 9% (ranging from 6% in Korea to 12% in Germany). |
| Nedelkoska and Quintini (OECD, 2018) | Bottlenecks according to Frey and Osborne. Level of correspondence estimated between bottlenecks and worker competencies according to PIAAC (OECD). | **Jobs**. Similar to Arntz *et al.*, with a broader range of jobs. More detailed analysis in terms of sectors, occupations and training levels. | Probability of the job being replaced by machines ≥ 70%. | Similar to Arntz *et al.*, with PIAAC data from 32 countries. | USA: 10% of jobs at risk of substitution. OECD: 14% (ranging from 6% in Norway to 33% in Slovakia). |
| McKinsey Global Institute (2017) | Evaluation of 18 'critical capacities' used by employees in the course of their work (2 000 activities across 800 occupations). | **Work activities**. Content of occupations according to the technical automation potential of the activities they involve. | Thresholds for the technical automation potential of individual occupations. | US Bureau of Labor Statistics, extrapolated to 45 other countries. | Threshold of 70%: 26% of occupations. Threshold of 30%: 60% of occupations. |
| Employment Advisory Council (FR) (2017) | Automation index based on the characteristics of work described by employees: relative importance of routines, flexibility, adaptability, problem-solving, social interactions. | **Employees** (at individual level). Grouping by sector and category of occupation. | Automation index ≥ 0.7. | Eight questions from a survey carried out by the Directorate for Research, Studies, and Statistics on employees' working conditions (FR). | FR: 10% of jobs at high risk. |
| Dengler and Matthes (DE) (2015) | Opinions from career and training experts. Proportion of routine tasks (and the level of routineness) in each occupation. | **Occupations**. Tasks within the same job are assumed to be homogeneous between occupations at national level. | Occupations where the proportion of substitutable tasks ≥ 70%. | Database on occupations maintained by the Federal Employment Agency (DE). | DE: 14% of salaried jobs at high risk. |

substitutable and non-substitutable tasks for each occupation; the higher the number of non-substitutable tasks (i.e. tasks featuring at least one of the three engineering bottlenecks), the more susceptible it is to automation. Frey and Osborne's study attracted a great deal of media attention and has been replicated – using the same methodology and hypotheses – in many European countries by various consultancy firms and think tanks (Bruegel, Roland Berger, Deloitte, ING, etc.).

This study is based on an extremely simplistic understanding of work, namely that occupations can be defined as a set of tasks common to all individual jobs, and that the automation potential of these tasks depends primarily on the technologies and their bottlenecks. In reality, however, a task can only be defined in relation to a larger organisational context and the paths followed towards specialisation or polyvalence, which can vary greatly between individual companies. A profession is more than simply a set of tasks; it is also a position within an organisation, experience gained over many years and skills acquired through training, a career path and membership of a team or a professional body. What is more, work organisation is the visible manifestation of negotiations, compromises and power relations between stakeholders.

A different approach can be found in a study carried out on behalf of the OECD (Arntz, Gregory and Zierahn, 2016), which takes as its starting point the notion that the content of jobs within one occupation is highly heterogeneous, and that the range of tasks varies greatly from one job to another. Most occupations are made up of tasks which have a high, medium or low probability of substitution by intelligent machines, but their relative proportions vary from one job to another depending on how each employer chooses to handle matters such as work organisation, skills management and innovation strategy. Employees themselves can sense the way the wind of technological development is blowing, and tend to favour tasks which are less likely to see them pitted in competition against intelligent machines. Although this paper uses the same sources as Frey and Osborne to evaluate technical automation potential (expert opinions and bottlenecks), it uses data from the OECD's Programme for the International Assessment of Adult Competencies (PIAAC-2012) to identify the variety of tasks within jobs performed by individuals; the figures cited therefore relate not to entire categories of occupations, but to jobs within them.[1] It is readily apparent that forecasts differ hugely depending on whether they are based on the assumption that occupations are homogeneous (Frey and Osborne, 47% of jobs in the USA at high risk) or heterogeneous (Arntz, Gregory and Zierahn, 9% of jobs in the USA at high risk).

An occupation is more than simply a set of tasks; it is also a position within an organisation, experience gained over many years and skills acquired through training, a career path and membership of a team or a professional body.

Although the definition of occupations in the Arntz *et al.* study incorporates qualitative considerations based on the authors' understanding of work, all such considerations end with the idea that jobs within a certain

1. The occupation of 'accounting employee' is a good example of this difference. According to Frey and Osborne, 74% of jobs in this occupation are highly susceptible to replacement by intelligent machines over the next two decades. According to estimates by Arntz *et al.*, the highly heterogeneous nature of the tasks performed within this occupation means that only 18% of jobs are at high risk of substitution (Arntz, Gregory and Zierahn, 2017, p. 159).

occupation are heterogeneous in nature, meaning that the technological determinism embedded in the opinions of AI and robotics experts and inherent to the idea of 'engineering bottlenecks' remains fully present. According to the authors, the main challenge we will face is not that of job losses but of job transformations, since over half of jobs in most occupations will undergo radical changes in terms of the skills required, the way work is organised and the balance struck between human and machine work.

Another study carried out two years later on behalf of the OECD (Nedelkoska and Quintini, 2018) takes the approach of job heterogeneity within a single occupation one step further by examining more exhaustively the correspondence between engineering bottlenecks and the worker competencies evaluated under PIAAC in order to break down findings at the level of industrial sectors and education levels. These findings differ from those of the Arntz *et al.* study in that they suggest that more jobs are highly susceptible to replacement in the majority of countries, but the figures remain in the same order of magnitude (Table 1). The authors focus on the high level of variability in terms of tasks and work organisation methods to explain the differences between countries rather than structural variations between industrial sectors, and also note that the jobs which are most susceptible to automation are those performed by workers who find it hardest to gain access to continuing vocational training. Finally, it has been asserted that previous waves of technological innovation polarised the labour market (Autor, 2015; ESPAS, 2018) to the benefit of highly skilled and low-skilled workers, and to the detriment of those in between; these latter may, however, be the winners of digitalisation, since the influx of information technologies has already forced them to diversify their skillsets and increase the proportion of relational, organisational or emotional tasks they perform.

The study by the McKinsey Global Institute (MGI, 2017) also focuses on worker competencies, but takes a very different approach to the three papers covered so far. It examines the extent to which 18 critical capacities, divided into five groups (sensory perception, cognitive capabilities, natural language processing, social and emotional capabilities and physical capabilities) are implemented in work situations, and compares the 'currently demonstrated' ability of humans and intelligent technologies to perform 2 000 work activities (grouped into seven categories – managing people, applying expertise, interfacing with stakeholders, collecting data, processing data, performing predictable or unpredictable physical activities) found in 800 occupations, across all sectors of the economy. Time spent on the different categories of activities is also calculated, making it possible to estimate the technical automation potential for each occupation and link this figure to its average hourly wage. Although labour statistics from the United States are used as a basis for the analytical work described above, the results are extrapolated out to cover 45 other countries, accounting for 80% of the world's workforce in total. The study concludes that, although less than 5% of occupations consist solely of automatable activities, 70% of activities are automatable in 26% of occupations, and 30% of activities are automatable in 60% of occupations. Whether or not this technical automation potential is actually harnessed, however, depends on many other factors, such as technical feasibility on the ground, the real-life costs of rolling out the technological solutions, how these costs compare

to salaries, workforce mobility and skills, and financial benefits other than those resulting from the replacement of labour with capital.

This study on the future of work is most notable for its detailed analysis of the competing abilities of humans and machines to perform the tasks which are, at least in theory, required in work situations – with the proviso that the description of work activities is based on forms of work organisation found within US companies (as is the case for Frey and Osborne's study). What emerges clearly is that humans and machines compete not just at the level of performance, but also at the level of costs.

A report by the French Employment Advisory Council (COE, 2017), which builds on a previous report by France Stratégie (Le Ru, 2016), suggests that worker testimonials can be used to gain a more down-to-earth perspective on work situations. The authors start by noting that the overall number of jobs has not yet dropped despite several decades of increasing computerisation (Autor, 2015), but that growth has been observed in occupations that call for skills relating to flexibility, adaptability, problem-solving and social interactions (+44% between 1998 and 2013); these are the occupations that are least susceptible to machine substitution, since technological performance and human performance are complementary and mutually reinforcing. By way of contrast, occupations which call for none of these four skills are already suffering the consequences (-9%), and are more likely to disappear as a result of this new wave of digitalisation. The study uses the 2013 iteration of a survey on working conditions carried out every seven years as a basis for identifying the extent to which French jobs require the four skills, and also establishes an automation potential index (COE, 2017, pp. 87-91), based on the statements of survey respondents rather than risk exposure probabilities. The authors calculate that just under 10% of jobs have an index higher than or equal to 0.7 (comparable to a probability of 70% in the Frey and Osborne study and the OECD studies).

> Evaluations of automation potential should not be carried out solely by tech experts, since it is equally important to analyse real-life jobs and workplaces.

The COE study posits that the content of jobs and work organisation matter more than technological performance when it comes to calculating susceptibility to automation, and confirms that – as postulated in the two OECD studies – workers tend to focus their efforts on the tasks which are least likely to be performed by machines in the future.

A study carried out in Germany follows a broadly similar approach, albeit based on VET (vocational education and training) needs analysis rather than working conditions (Dengler and Matthes, 2015). A survey carried out by the authors among career and training experts and practitioners, working in different institutions and addressing different skills levels, was used as a basis for estimating the proportion of repetitive or highly predictable tasks (i.e. tasks susceptible to automation) in different categories of occupations. Occupations are assumed to comprise a homogenous set of tasks based on the fact that they are regulated to a relatively high degree under the German system of collective wage agreements and negotiated VET agreements, and the authors' findings (14% of salaried jobs at high risk of automation) are in the same magnitude as those in the Arntz *et al.* study.

It would therefore appear – unless we take Frey and Osborne's estimates literally – that the prospect of a world without work is an improbable one in the near future, but that professions and jobs are extremely likely to undergo far-reaching transformations.

This finding is not a new one, however. A glance back over past research into the relationship between work and technology reveals that the topic of machines replacing human labour has aroused brief flurries of interest ever since the early 1980s (Valenduc and Vendramin, 2016, pp. 26-29). The papers published at the start of this period were often pessimistic, and government reports in several countries (France, Germany, the Netherlands and the United Kingdom) focused on the risks for employment posed by the burgeoning field of microelectronics and the likelihood that there would be more jobs lost than created – alarmist prophecies which did not come to pass. Researchers working in the 1990s tended to focus on qualitative considerations and changes in the structure of jobs, taking a particular interest in sectoral structures and skills structures, winning and losing professions and increased work flexibility. At the turn of the century, hype around the 'new Internet economy' added fuel to the controversy over its potential to destroy or create jobs, but the bubble burst quickly and gave way to a more nuanced view of information and communication technologies (ICTs) as amplifiers of certain corporate restructuring and work transformation trends, in particular greater flexibility and the emergence of new forms of work. The 2008 crisis – described by evolutionary economists as part of the transition between the installation and deployment phases of a technological revolution which started in the 1980s (Perez, 2010; Valenduc, 2018) – brought the idea of a digital economy back to the forefront of everyone's mind, and it is only logical that the uncertainty associated with this 'digital transition' should give rise to new questions about the future of work and employment.

The topic of machines replacing human labour has aroused brief flurries of research interest ever since the early 1980s.

## More than just a set of tasks – the social significance of work

Work cannot be reduced to nothing more than a set of tasks which can be performed to a greater or lesser extent by machines – as a constituent value of our modern society, work functions as a source of social identity, social standing, rights, duties, status (along a scale of social prestige), integration and recognition, which is why exclusion from work is synonymous with exclusion from society. Over time, societies have become work-based societies, accustomed to thinking of work as an activity through which human beings can transform the world in which they live and make their mark on it, and as one of the primary means of participating in its social life and expressing their personality (Méda and Vendramin, 2013); even more recently (over the past few centuries), the notion of work and individuals' expectations of it have acquired yet more layers of meaning. Although work appears in economists' equations as a factor of production which must follow the same rules as other

such factors (i.e. the more efficient, the better), work is also experienced as an opportunity for individuals to achieve their full potential, and as a way in which income, rights and protections can be distributed throughout society. Although working conditions have undergone major transformations, and although work is increasingly the root cause of disorders and dissatisfaction among workers, every iteration of the EVS survey[2] has confirmed the huge role it continues to play in the lives of European citizens; in 2008 (as in 1990 and 1999), only a minority of respondents (less than 20% in almost every country) agreed with the statement that work is 'not very important' or 'not at all important' in their lives, and the 2015 iteration of the ISSP survey[3] (part of the 'Work Orientations' module series) produced similar results.

Work fulfils a dual purpose in that people want to work not only in order to earn a living and have access to certain rights and protections, but also in order to gain recognition and to pursue goals relating to self-development and self-affirmation. Yet debates on the end of work typically skip over the social significance of work, and the same is true for the heated discussions on a basic income which often ensue during periods of high and persistent unemployment. One such period occurred in Europe from 2010 onwards in the aftermath of the 2008 crisis, when the continent was dogged by high levels of unemployment, a gloomy outlook for growth and jobs and heightened inequality between social groups, topped off by alarmist predictions regarding the disappearance of whole swathes of the labour market as a result of the new digital economy – all of which meant that the time was right for the debate on the basic income to escape the ivory towers of academia.

Debates on the end of work, and heated discussions on a basic income, typically skip over the social significance of work.

There is widespread confusion between terms such as 'basic income', 'unconditional income', 'citizen's income' and 'universal allowance', even though all of them have different meanings and are used in different contexts and by different stakeholders; and there is also a fierce yet confused debate between proponents and opponents of the idea, particularly in the world of politics. A number of different trials have been attempted, but their primary aim has been to fight unemployment or poverty rather than to realise an alternative vision of work.[4] A society built around a basic income has also been held up as a solution to unemployment in response to fears triggered by new waves of technological innovation, with writings on the subject ranging from utopian visions of a world in which people are free to be mobile because income is no longer dependent on work, through to reassessments of the various substitute incomes or allowances (Van Parijs and Vanderborght, 2017). In 2015, a survey carried out in French-speaking Belgium among young people (both employed and unemployed) aged between 18 and 30 (Vendramin, 2019) revealed that respondents viewed the idea of

**2.** The EVS (European Values Survey) is a large-scale, cross-national and longitudinal survey on European behaviours, opinions and values, which has been carried out every nine years since 1981.

**3.** The ISSP (International Social Survey Programme) is a cross-national programme which was established in 1985 and which now covers around 40 countries worldwide. Surveys are conducted every two years on diverse topics relevant to social sciences, and the fourth iteration of the 'Work Orientation' module was carried out in 2015.

**4.** A trial in Ontario was cancelled, and a trial in Finland was completed but not extended; an experiment will be carried out in a single town in Switzerland in 2019. Elsewhere, Italy's anti-system 5-Star Movement has included a 'citizen's income' in its budget, which – despite its name – is anything but unconditional and universal. The idea also appeared in the manifesto of the French Socialist Party's nominee for the presidential elections, but the nominee (Benoît Hamon) was defeated in the first round.

an unconditional revenue cautiously or even critically, regarding it primarily as a benefit by any other name; many believed that it was incompatible with values such as merit and duty, and there was broad agreement that people should not receive money without any counterpart. They thus regarded it as unlikely that a 'life on benefit street' would ever replace the experience of working or serve as an equivalent source of recognition, identity, social participation and citizenship (Chevalier, 2018). Responses to the 2015 ISSP survey paint a similar picture: 78% of young people in Germany aged between 18 and 30 agreed with the statement 'I would enjoy having a paid job even if I did not need the money', with equivalent figures of 70% in France, 67% in Belgium, 60% in Spain and 74% in Sweden. Societies are built on a triple exchange of giving, receiving and giving back, and the problem inherent to the unconditional income, which does not require recipients to work, engage in training, or look for employment, is the lack of reciprocity (de Foucault, 2010). Proposals for a world in which the need to work is obviated (even in part) by a basic income are indicative of a reductive concept of work and a failure to take full account of its social dimension, even though the latter is a major and by no means only theoretical obstacle to the end of work, and the potential of new technologies is largely irrelevant to the task of overcoming it.

Proposals for a world in which the need to work is obviated (even in part) by a basic income are indicative of a reductive concept of work and a failure to take full account of its social dimension.

The definition of work itself – in a digital economy characterised by a proliferation of new ways of working, in particular via platforms and networks – also raises questions about our understanding of concepts such as employment, work and activity. Harribey (1998) defines 'activity' as any use of time for domestic, productive, leisure or social purposes, 'work' as an (economic) activity carried out with the aim of producing goods and services for domestic or non-domestic use, and 'employment' as the institutional framework (established by law or by custom) for salaried or freelance work, in either the commercial or non-commercial sector. He explains that 'activity' in the broader sense of the word should not be confused with 'economic activity', and demonstrates how the idea of 'full activity' gradually replaces the seemingly unattainable idea of 'full unemployment' during periods of high unemployment. This trend towards the promotion of opportunities for 'activity' rather than paid employment may be heightened by new technological opportunities.

## By way of a conclusion: the end of work, or the erosion of employment relations?

Ultimately, the most likely outcome is a displacement of work by technology rather than its replacement. Against a backdrop of accelerating globalisation, technological developments have shifted jobs to different links of the value chain at both European and global level, and this restructuring of value chains has altered the relative importance of industrial sectors in national and regional economies. Jobs have shifted between categories of occupations,

widening the gap between the highly skilled and the least skilled (ESPAS, 2018), and other shifts can also be observed, for example between different employment statuses, between stability and instability and between security and precariousness. Several recent developments in the digital economy are accelerating these shifts yet further, such as the gig economy which operates via online platforms, virtual work, nomadic work, on-demand work, new recruitment channels, a rise in economically dependent self-employment and an increase in web-based piecework (Casilli, 2019) which is poorly paid and offers little or no social protection.

These developments challenge the very foundations of employment relations – the idea of a workplace, and the meaning of working time and how we measure it. The practices enshrined in the platform economy undermine the shaping process of wages, and the subordination relationship is becoming ever more blurred. The scope of collective representation and social bargaining must be extended to include new forms of solidarity for workers in occupational contexts where they are being forced to diversify and increasingly dispersed. What all of this means is that employment relations – and the protections associated with them – are breaking down (Serrano Pascual and Jepsen, 2019).

Displacement of work by technology is more likely than its replacement.

When examining the impact of digitalisation on employment, we must not therefore limit our focus to the replacement of human labour by intelligent machines. We must instead broaden our gaze and think about what happens when traditional jobs are replaced by an increasingly diverse range of new forms of employment, and about the changes we are seeing to the significance of work and its place in society.

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