

# Toeing the line. Working conditions in digital environments

Over the course of the last two decades, new technologies have gradually shaped a "new world of work". These new working environments are confronting workers and their organisations with a wide range of challenges.

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**When they first appeared on the market, replacing traditional mobile phones, who could have predicted that smartphones would transform the economy to such an extent?**

Image:   Belga



Under the joint effect of a new generation of digital technologies and a higher pace of organisational change in companies, working environments are subject to major transformations. Whether in manufacturing or services, working environments are full of new devices: communication chips, geolocation devices, autonomous robots, embedded software in all machines. Behind these devices, powerful and intransparent algorithms use billions of gigabytes to remotely control production processes, track goods and individuals, predict behaviour, influence preferences and many other things we would never have thought possible just ten years ago when the first smartphones appeared on the market. In this "digital economy" (see box, p. 15), what's happening to well-being at work?

### Permanently online

"Technostress", a phenomenon associated with working permanently online, has been the subject of many studies over the past few years<sup>1</sup>. The term "technostress" refers to work-related psychosocial stress. It occurs when the potential benefits offered by the new digital devices mutate into pressure being put on an employee in the form of explicit or implicit expectations of an employer or colleagues, customer expectations or demands, connectivity problems disturbing normal working routine or when workers become dependent on digital devices, in particular mobile devices such as smartphones or tablets.

Information overload is a frequent form of technostress. The constant use of emailing, instant messaging and social media leads to information overload, as well as frequently interrupting work. This in turn generates constant pressure to reply to all signals received or to signal one's presence. Moreover, a frequent feature of electronic messages is the absence of organisational filters, especially when the same messages are sent to a large number of recipients, without any order of priority or preferred destination. It is therefore up to each employee to adopt his own selection and evaluation criteria, while incurring the risk of being admonished for having ignored information he must have received. This permanent mix of significant and insignificant information characterising the Internet and social media is a source of mental fatigue, as is the need to be permanently accessible and available. Moreover, anyone frequently using Internet may suffer from a loss of spatial and temporal anchors due to the apparent overcoming of distances and time differences. The "real-time" character of online work often turns out to be "unreal time".

The effects of technostress include general and chronic fatigue, an apathetic or cynical attitude, concentration problems, muscle tension and other physical pain, and burnout. In addition to these effects, which are quite similar to those of work-related stress in general, technostress can cause attention deficit disorders (ADD). These make workers unable to properly manage their priorities and their time, generating feelings of panic or guilt.

What is however new is that a growing proportion of workers are suffering from what can be called "digital stress". This is affecting not just managers, but also professionals in all fields of work, technical and sales staff, healthcare providers, etc. The development of digital nomadism is one of the causes of this increase. Permanently dependent on online digital devices, this is a form of work organisation doing away with a fixed workplace. A workplace can now be anywhere: an ever-changing desk within a company, at a customer, on a posting, at home, in shared spaces, etc. Even the notion of a "workplace" ultimately loses its validity. According to Eurofound, multiple workplaces now characterise the working lives of almost a quarter of the European workforce<sup>2</sup>.

Apart from technostress, digital nomads are also at risk of becoming dependent or even addicted to such mobile devices, using them compulsively, finding it difficult to log out even for a short space of time,

1. Popma J. (2013) *The Janus face of the "New ways of work": rise, risks and regulation of nomadic work*, Working Paper 2013.07, ETUI, Brussels.
2. Mandl I. et al. (2015) *New forms of employment*, Eurofound, Publications Office of the EU, Luxembourg.

showing withdrawal symptoms ("cold turkey") after stopping using them, at risk of a relapse after periods spent logged out, etc. For many digital nomads, managing online and offline time can become an important issue, not just in terms of stress but also in terms of work/life balance and of responsibility within an organisation<sup>3</sup>. In the face of such risks, a number of official reports are calling for the introduction of a "right to be offline"<sup>4</sup>, a right already found in a few collective agreements in companies.

### Working with robots

Looked at from a traditional perspective, the effects of robotics on work situations are seen in terms of substituting labour by capital. In highly robotised environments, the only tasks remaining for human labour are setting control parameters and maintenance. With the development of a new generation of robots, this substitution logic is obviously not going to disappear, but it is now competing with a complementarity logic. The new robots are considered to be "autonomous" and "learning", benefiting from innovation convergence in such fields as voice recognition and synthesis, shape recognition, 3D digital vision, perception of distances and volumes, direct machine-to-machine communication often using sensors (the so-called "Internet of things"), and learning capabilities due to algorithms based on big data. Though they are technically in a position to work together with humans, it is obviously not the robot who is going to organise such collaboration.

In this context, the question of human robot interfaces (HRI) is becoming a new field of research covering working conditions and safety at work in environments being taken over by mobile, learning robots<sup>5</sup>. Three major issues need to be mentioned. The first concerns "augmented reality", i.e. the instantaneous insertion of elements stemming from artificial vision or generated by simulation software into real world images. Well-known in the world of video games and the military field, and made popular

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by *Google glasses* (see the article on p. 22), augmented reality is now increasingly used in manufacturing, in maintenance work in hostile environments, in logistics and in surgery. From a working conditions perspective, one key question involves finding the right balance between a worker's own visual and sensory perceptions and those generated by an augmented reality system, with a view to guaranteeing both safety and performance.

The second issue is that of the complexity of work situations. On what should we focus our attention, for example to prevent accidents, given the plethora of information processed and issued by robots? How can we anticipate the behaviour of a mobile robot? How can we design safe workplaces used simultaneously by robots and humans? What does collaborating with a robot actually mean? Collaboration between humans is often based on the definition of common goals to be achieved as a team, but can there be goals shared by robots and workers? Such questions are more concerned with work organisation choices than the intrinsic performance of the technology.

The third and final issue concerns the intuitive interfaces in the interaction between a worker and a robot: not just tactile interfaces such as those used in smartphones, but also gestures, verbal expression, emotional reactions, spontaneous movements. Intuitive programming, which is based on a worker demonstrating certain movements and the

3. Jauréguiberry F. (2010) Pratiques soutenables des technologies de communication en entreprise, *Projectique*, De Boeck, 2010/3, 6, 107-120.
4. Mettling B. (dir.) (2015) *Transformation numérique et vie au travail*, Rapport pour la Ministre Myriam El Khomri, Paris, La Documentation Française, September 2015, 52-53.
5. Moniz A.B., Kings B.J. (2016) Robots working with humans or humans working with robots? Searching for social dimensions in the new human-robot interaction in industry, *Societies – Open Access Sociology Journal*, vol. 6, 4, 23-44.
6. EU-OSHA (2015) *A review of the future of work: robotics*, Discussion paper, Bilbao, European Agency for Safety and Health at Work.
7. Went R., Kremer M., Knottnerus A. (2015) *Mastering the robot. The future of work in the second machine age*, Den Haag, The Netherlands Scientific Council for Government Policy.

8. De Stefano V. (2016) *The rise of the "just-in-time" workforce: on-demand work, crowd work and labour protection in the gig-economy*, Geneva, ILO Conditions of Work and Employment Series n°7.

9. Huws U., Joyce S. (2016) *Crowd working survey: the size of the gig economy in Austria, Germany, the Netherlands, Sweden and UK*, Report for FEPS and UNI-Europa, Hatfield: University of Hertfordshire.

## The digital economy in a nutshell

Looking at the various definitions of what the digital economy is, we see four overriding features. First, the sheer mass of digitalised information ("big data") available for exploitation by very powerful algorithms, is becoming an increasingly strategic economic resource, in all sectors and on a global scale. Second, a new model of industrial production is emerging, sometimes referred to as "Industry 4.0", with the help of a new generation of inter-communicating devices (the Internet of things), machines capable of learning through exploiting big data and of moving around without human intervention. Third, networks are becoming an organising principle not just of the economy but also of society, profoundly changing our conception of distance and time. Last but not least, the online platform business model, also known as "two-sided markets" is gaining ground, gradually replacing more traditional business models for providing services or distributing goods. These features are not completely new, with the exception of the platform model. They combine trends associated with the development of the information society and observed for many years now, with more radical changes, often termed "disruptive".

robot copying them, questions the classical distinction between encodable knowledge and tacit knowledge. In certain cases, for instance the use of exoskeletons (see the article on p. 27) where robots become appendages of the human body, interfaces take on completely new forms. Though such robots can make the execution of certain strenuous tasks a lot easier, their usage requires a recast of the methods used to assess safety at work<sup>6</sup>.

In the face of all these challenges, some authors are pleading for "inclusive robotics"<sup>7</sup>, i.e. developing *bottom-up* innovation practices, where technology designers and end users work together to find the best distribution of tasks between humans and robots. Priority should also be given, especially via lifelong learning, to providing workers with greater autonomy and more control over their work environment, in a context where the border between the capabilities of humans and those of intelligent machines is constantly shifting. Finally, we need to decide which tasks, which relations and which responsibilities need to be left in human hands, whether individually or collectively.

### Platform work

The expansion of business models based on online platforms is one of the features of the digital economy. These models promote the development of new forms of work, such as crowdworking or on-demand work (see box, p. 16), giving rise to what is now known as the gig economy<sup>8</sup>. These new forms of work cover a wide variety of situations. Those most visible are the services provided with the help of platforms: the driver working for Uber, the Deliveroo cyclist (see the article on p. 17), the handyman doing home repairs via Taskrabbit, the nurse providing care services in people's homes via an on-demand healthcare platform. But these are just the tip of the iceberg.

The platform economy also employs large numbers of workers behind the scenes, for instance workers in "click farms" who spend hours clicking on "likes" to fake popularity rankings, "web cleaners" whose job

it is to remove from the web various forms of disputed or illegal content or simply content undesired by those paying to have it removed, "web taggers" who add keywords or lapidary comments to photos or videos, or "decoders" who perform recognition tasks on images, sounds or texts that robots are still unable to perform. And then there are those whose work consists of producing fake reviews on travel websites, fake consumer advice or fake news (see the article on p. 31). Finally, also in the submerged part of the iceberg, we need to mention all the unpaid work done by "prosumers" (producers/consumers) who fuel the platforms by providing them with their personal data, preferences and habits, their ranking of the goods/services they buy, etc. This information generates value which is then exploited by the platform. However, when a human performs an activity within a minimal contractual context (the click accepting the platforms terms and conditions) that generates value monopolised by a capital holder, this is to be seen as work...

From a working conditions perspective, platforms rely on a "just-in-time" and "just in case" workforce, whether on a global or local scale. Working hours and workloads are hardly predictable, and urgency is the main factor governing the management of time. High availability is required, and safety/well-being at work provisions are non-existent or, at best, minimal. Remuneration is set per task (gig), and is sometimes very fragmented or even subject to bidding, i.e. given to the lowest bidder. Workers are isolated from those ordering their work, negatively impacting their balance of power. People permanently working online are particularly exposed to technostress. Via the disclaimers in their standard contracts, platform owners assume no fiscal or social responsibility, instead passing it on to the service providers and users.

But what drives people to work in the gig economy? They are driven by unemployment, precarious work, under-employment or even poverty in some countries. In Europe, according to a series of surveys in several countries<sup>9</sup>, the majority of these



10. Graham M., Hjorth I., Lehdontvira V. (2017) Digital labour and development impacts of global digital labour platforms and the gig economy on worker livelihoods, *Transfer*, vol. 23, 2, Sage Publ., 135-162.

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## In our de-structured world of virtual work, workers find themselves confronted with the need to rebuild their own personal professional identity.

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crowdworkers work for platforms for extra income, though there are indications that this is not the case in Asia and Africa<sup>10</sup>.

### Work, but with what employment relationship?

The development of these new forms of work is threatening the very foundations of traditional employment relationships. The notion of the workplace, one of the cornerstones of labour legislation, is questioned by the development of digital nomadism and virtual work, with the borders between work and private life becoming increasingly blurred. Similarly, the increase of project-based / target-based / task-based work is making the significance and measurement of working time more complex, as work now has no direct relationship to the amount of time actually worked.

Wage formation is questioned by the practices prevalent in the platform economy, as seen by the use of piecework and competitive bidding for work. The principle of subordination governing the employer-employee relationship is becoming blurred, with a no-man's land now existing between employee status and self-employed status. At the same time, we are seeing a certain entrepreneurial logic developing among employees who now find themselves competing with each other, and conversely a wage logic developing among the self-employed, who are calling for joint standards and codes.

In the face of these trends, ways of generating social bonding at work and expressing collective action are taking on new forms. In the de-structured world of virtual work, workers are finding themselves confronted with the need to rebuild a specific professional identity, able to ensure both self-esteem and recognition. They are also feeling the need to voice their opinions via online tools enabling them to manifest their collective interests through for example circulating petitions, developing alternative systems for rating platforms or those placing orders, sharing positive and negative experiences, and reaching out to the media (read article on p. 36). At stake here is the relationship between individual and collective interests. ●

### Working for platforms

The platform business model now extends to labour markets, reviving the principle of labour exchanges and auctions. We can distinguish between several forms of platform work: those open to crowds (i.e. crowdworking platforms) or those based on an exceedingly flexible employment relationship in the form of on-demand or on-call work.

The first category covers immaterial micro-tasks. Operated on an international scale, the "gigs" offered are subject to competitive bidding (i.e. the lowest bid gets the job) and without any professional requirements. Amazon Mechanical Turk is a typical example of such a platform, constituting a globalised marketplace for virtual and exceedingly fragmented tasks. A further form of crowdworking platforms, while also focuses on immaterial tasks, targets a more restricted clientele consisting of freelancers certified by the platforms, i.e. adding a certain degree of professionalism. This is leading to a

standardisation of freelance work, in the form of fixed hourly rates. Finally, crowdworking is also found in the field of material services: transport, temporary lodgings, packet / meal deliveries, household work, etc. Rates are set either by the platform (e.g. Uber, Deliveroo), or by supply and demand (e.g. TaskRabbit, Listminut).

The second category exploits the potential of digital technologies (geolocation, smartphone apps, web platforms) to get the most out of contracts not specifying a fixed volume of work (e.g. zero-hour contracts), thereby developing the "just-in-case" management of large reserves of on-call workers. Though not new, in combination with online platforms and with geolocation used to match supply and demand, this form of employment is on the upsurge. This can involve tasks which have nothing to do with the digital economy (e.g. homecare, babysitting, household repairs), but which are managed by digital systems.