Commentary

Service Sector Work under Pressure from New Technologies and Artificial Intelligence – Lessons from a Number of Foresight Studies

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The use of new technologies is becoming increasingly widespread in the world of work. Robotisation in industry is well known, but there are many uses in service activities that go unnoticed because they do not involve major changes to work processes. Yet they can have a significant influence on working conditions. Other uses in the service sector are leading to major changes, the scale of which means that they are completely overhauling working methods. The example of cycle-delivered meals shows that the social context means that these new forms of work can be difficult to adapt to ensure workers' health. The increasing deployment of artificial intelligence could multiply the number of such cases in the years to come, so we need to be vigilant about the changes in the daily lives of service workers that will ensue.

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Since the beginning of the industrial revolution, workers have lived in fear that the automation of work would lead to job destruction. These fears have proved unfounded, since automation (first in industry and then progressively in services) has led to job reallocations that have contributed to an increase in labour productivity on the one hand, and on the other hand, to meeting new needs (particularly in services) that have led to the creation of new jobs. However, given the massive introduction of new technologies into the world of work over the last few decades, and the more recent introduction of artificial intelligence, it is legitimate to ask the question again today. This is what we have done through several studies focusing on the consequences in terms of occupational risks of the increasingly massive use of these technologies [1][2][3][4].

Over the past few decades, there has been a steady decline in productivity gains in developed countries, across all sectors. In France, productivity growth was 2.6% per year on average in the 1980s, 1.9% in the 1990s, 1.2% in the 2000s until the 2008 financial crisis and 0.8% since 2010.There are several types of explanation for this phenomenon, some economic, others technical, which will not be explained here since we will limit ourselves to the work of two American economists [5]: Daron Acemoglu and Pascual Restrepo. These two researchers associate this drop in productivity gains with a parallel weakening of the dynamics of new job creation. Current economic policies would favour automation (in a context where companies benefit from a high amortisation of investments), including through the use of so-called 'so-so' technologies. The latter are described as 'mediocre' in the sense that they do not represent, in terms of innovation, a spectacular progress that would allow a sudden gain in productivity. They therefore do

not provide sufficient margins for reinvestment in major innovation. These technologies have typically been used on a massive scale in the service sector, and have led to an evolution in white-collar jobs.

Among these technologies, we can identify RPA (Robotic process automation). This technique, which most often uses weak forms of artificial intelligence, consists of reproducing human work incomputerised form: the process remains identical, but all or part of the work is carried out by meansof an algorithm. The algorithm may, for example, acquire the initial data by optical character recognition and process it, then pass it on to another algorithm for further tasks or generate responses by email as part of an automated process. Just as a worker would have done. This technique is particularly useful for processing large amounts of data that must be processed regularly and repeatedly. It reduces errors and, above all, allows workers to concentrate on operations with higher added value. Banking and insurance are among the main activities interested in RPA for processing their data. It is also useful for managing consumer relations, for example for handling complaints or for managing orders in e-commerce.

The great advantage is its low cost: it does not require the redesign of a company's activities since itconsists of automating time-consuming activities without changing the process architecture. It therefore requires only minor adaptation of the company's IT systems to which it is adapted. Experience also shows that, in the long term, if the substitution of human labour by RPA is strong, job losses may result. On the other hand, as in the case of industrial robotisation operations, if tasks that had been relocated to low labour cost countries are relocated to be processed by RPA, this return can generate (low volume) job creation.

These techniques are still in their infancy. Advances in artificial intelligence and machine learning will open up a wide range of development opportunities [2]. It will no longer be a matter of transferring simple, repetitive tasks to an automatic processing system, but of enabling this automatic processing system to take on complex tasks within a process and to adapt to varying demands as required. This will be known as Cognitive Robotic Process Automation (CPRA). Through machine learning, RPA acquires a "computer brain" and the ability to adapt and improve itself according to changing needs, including predictive analytics. This is achieved by using techniques such as natural language processing, optical character recognition, data mining and the aforementioned machine learning. According to its promoters, CPRA does not call into question the

decision-making role of humans, who will always have the final validation. However, the same proponents recognise that, given the tools used, in a number of cases the 'intellectual' paths of the robot cannot always be objectified.

It is obviously impossible to judge the consequences that the development of these technologies is likely to have in a few years' time. Even if they are currently presented as a means of enriching work, by enabling those whose work they take over to focus on more conceptual and rewarding tasks, the effect on employment could in the long term not be negligible. They will require support for workers undergoing retraining, in particular through training. As Acemoglu and Restrepo point out, the management of these employment issues is above all the responsibility of the States, which have various levers (taxation, employment policy, occupational and public health regulations, etc.) to regulate the practical consequences of the deployment of these techniques. As for future developments (CPRA for example), while they will make it possible to eliminate tedious and repetitive tasks, which is obviously a step forward in terms of working conditions, the question of the validation of their production by the workers who will be in charge of them should not be taken lightly. It is likely to create anxiety, even stress, if the worker is not able to understand what he is validating.

New technologies have also contributed to the evolution or creation of certain commercial activities. One example is the development of ultra-fast fashion [6], which has been to the detriment of traditional sales activities in brick-and-mortar stores. The entire logistics chain has been reorganized, from the unbundling and sorting of parcels (which now often arrive from the Far East) to delivery to private homes instead of traditional stores. These transformations have also often led to a change in the status of workers: from salaried employees to the self-employed.

Information and communication technologies have also given rise to new professions and new ways of practicing them: Uber and Lyft drivers, for example, have come to compete with traditional cab drivers. The creation of intermediation platforms (Uber Eats, Deliveroo) between two-wheeled couriers and customers delivered at home has led to an upheaval in business practices and conditions. In a country like France, the self-employed status of these workers has deprived them of good-quality social protection, while at the same time, the use of two-wheeled machines to carry out their trade has subjected them to high levels of occupational risk (accidents). These risks are further

increased by the algorithmic management of the distribution of orders to be delivered, which does not take into account the reality of the field (weather conditions, traffic jams) and of the work, and can generate accident situations. Subjected to excessive time constraints imposed by the platforms and to competition exacerbated by the low level of remuneration for delivery, delivery bike riders are encouraged to take risks. Analysis of their work shows that they do not have the means to organize effective risk prevention, which should logically be the responsibility of the platform [7].

The development of artificial intelligence (AI) in the coming years, the first effects of which we have seen with these intermediation platforms, therefore warrants immediate consideration to ensure that working conditions in the service sector (as in industry) will be acceptable. A study was recently carried out to determine the minimum safety and security conditions that must be met if artificial intelligence techniques are to be deployed in such a way as to improve working conditions rather than worsen them [8]. It highlighted the following points in particular:

- There is a challenge for stakeholders to promote the development of AI systems that are compatible with the core values of the European and French approach to OSH (collective approach, data protection, social dialogue). The current hegemonic position of the American and Chinese digital giants therefore raises questions.
- The use of AI systems in OSH may come up against the "wall of explicability" (especiallyfor devices using deep learning) and therefore of the understanding of messages and decisions generated by AI. The development of AI uses for occupational risk prevention purposes will require both fostering a good understanding of these tools (virtues and limits) by employees and employers, and promoting the emergence of transparent solutions (e.g., hybrid AI systems: power of AI and transparency of logical reasoning systems) facilitating debates between stakeholders.
- The logic of making investments in these sometimes costly technologies profitable can lead to these systems being positioned at the centre of the organisation of work, at the risk of relegating human work to the background.
- Attention should be paid to the possible risks associated with the use in OSH devices of AI algorithms that have not been developed specifically for this purpose (open source libraries, off-the-shelf products).

- The development and marketing of devices using AI techniques presented as prevention tools must be carried out by people with solid OSH skills. In addition to the training to be provided within the company, modules should also be implemented in the curricula of management and engineering schools, in order to make future sponsors and developers of AI systems aware of the opportunities and risks that these new technologies bring with them in terms of OSH.
- Collective reflection (such as a consensus conference) must be conducted on the issue of data used in AI devices relating to OSH. In particular, it will be necessary to define rules for the constitution of data sets and the framework for their use according to the fields of application. In addition to the users, the social partners and qualified personalities (experts, philosophers, ethics specialists, lawyers, etc.) should be involved.
- The development and dissemination of methodological tools to guide the actors in the face of these innovations are a major challenge to prevention organisations.

These different examples illustrate the diversity of the use of new technologies in the organisation of work in the service sector. The consequences also vary widely. There has been a sharp rise in psychosocial risks in these activities over the last few decades. Many companies have made efforts to combat them, with varying degrees of success. The expected rapid spread of artificial intelligence techniques could lead to a further deterioration in the situation, and it is important to prepare for this now by raising the awareness of the various players involved.

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Declarations