COVERSTORY

Artificial intelligence and digitisation are now becoming part of our daily lives. Will these innovative technologies make humans obsolete for certain trades? These are recurrent questions when we discuss the future of employment.

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THE FUTURE OF WORK

THE END IS NIGH?

The world of work is in complete metamorphosis and could see changes take place much more quickly than expected. Whilst previous industrial revolutions have provoked as many concerns as they have brought progress, the most recent one is even more questionable since digitisation affects all sectors of the economy. The mutations that are emerging promise a transformation of current models on a global scale. How are we going to work in the future? In 20 or 30 years, new jobs will have been born, others will have disappeared. What will be these professions of tomorrow and which ones are doomed to disappear? Are all our jobs destined for the scrapheap or will they simply evolve? There are the questions ...

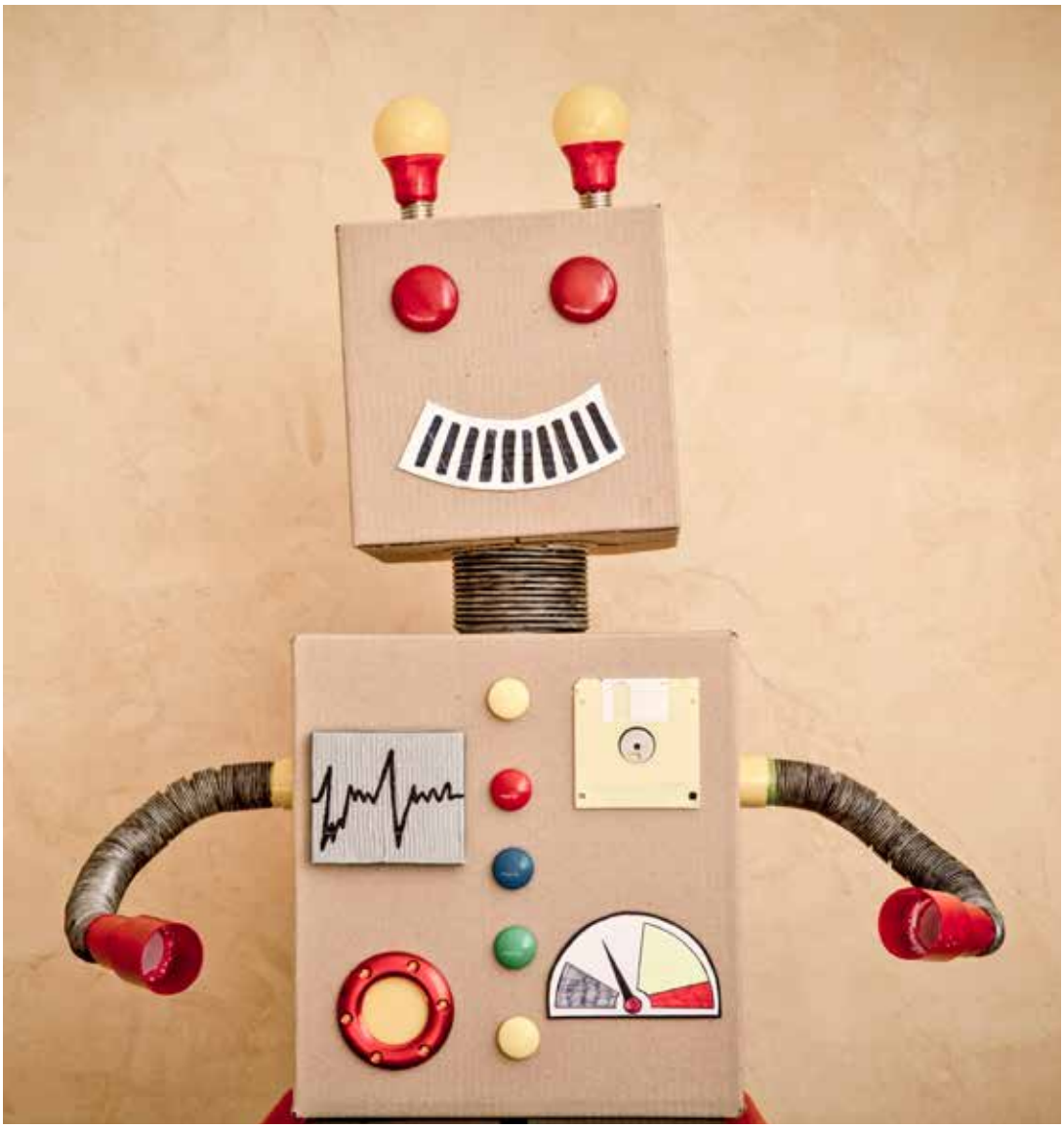
Texts: Michel-Edouard Ruben and Corinne Briault

Thinking about the future of work whilst the world economy lives through a third industrial revolution[1] is to ask a series of potentially anxiety-provoking questions. Is the end of work nigh? Will the robotariat succeed the proletariat? Will it be necessary to introduce a basic income and/or tax the robots? What will be the jobs of tomorrow? These are critical issues if work is to distance itself from the three evils of vice, boredom and need, and if social protection funding, mentioned three times in Luxembourg's Labour Code as based on full employment and one of the "solemn obligations" of the United Nations 2030 Agenda for Sustainable Development, is to be sustainable.

But alas, responding categorically and confidently to these questions is not easy. If, according to the adage, it is impossible to make predictions especially when they concern the future, this is particularly true of the labour market in the current context. In this third industrial revolution in progress we can see the emergence of a set of disruptive technologies which can transform both the demand for and supply of work but there is little possibility of defining the future that will result. ▶

Forgotten trades …

Who remembers the wandering grinders who sharpened life's small everyday objects with a stone; the milkmen who made daily home deliveries; laundresses or washerwomen who disappeared with the appearance of washing machines; lamplighters who experienced the same fate with the advent of electricity; telegraphists who fell into oblivion with the introduction of the telephone and the internet; executioners; "itinerant pleasure traders" who just sold pastries; lift attendants; or closer to us, renters of VHS tapes. Some trades, even if they appeared some centuries ago, have nevertheless managed to resist and even buck the trend, like barbers, coachmen or farriers!



01.

Because despite the sizzling announcements and sometime thunderous statements, there is no real consensus on what the impact of robotics, artificial intelligence, new energy approaches, and the spread of ICT – which are at the heart of the third industrial revolution – will be on the volume and nature of future jobs.

If, at first, some authors claimed that the new disruptive technologies – given the speed of their diffusion and the possibilities of automation they offer – could eliminate up to 50% of jobs in advanced economies, more recent research has tended to add nuance to this catastrophic scenario. According to a widely circulated OECD study, "only" 9% of jobs could be automated in the 21 OECD countries, and according to the International Federation of Robotics, industrial robots could create from 2 million to 3.5 million new jobs worldwide within a decade.

The discrepancies in these estimates may be explained by the statistical methods used. Some studies (which find a substantial risk of technological unemployment) measure only the gross destruction of existing jobs but ignore the possible transformation of these jobs by innovative technologies and they implicitly assume that a profession which becomes "technically" susceptible to automation will soon be threatened with extinction. Others (OECD) consider the complexity of tasks within certain occupations and suggest that some occupations, considered to be at considerable risk from automation, may not be threatened because a substantial number of the tasks involved are difficult to automate.

These differences can be explained by the fact that the use of innovative technologies is a com-

Photo: Journal du Geek

02.

plex process that can be slowed down by economic, legal and social obstacles. The impact of automation and digitisation on employment will therefore be the result – difficult to grasp – of several effects:

- the effect of substituting capital for labour
- the effect on productivity which may increase production and salaries and increase the demand for work and/or reduce working hours
- the effect on competitiveness that may boost growth in the market.

Finally, these differences reflect the fact that whilst technological change generally generates new jobs related to the demand for innovative technologies and the emergence of new products, it is impossible – at this stage of our knowledge – to "guess" with any certainty what the jobs of the future will be since they are, for the most part, not yet known. ▶

01. In each industrial revolution, thinking about the future of work is tantamount to asking a series of potentially anxiety-provoking questions about future disruptions, especially the disappearance of work and its replacement by robots.
02. If, at first, some authors claimed that the new disruptive technologies – given the speed of their diffusion and the possibilities for automation they offer – could eliminate up to 50% of jobs in advanced economies, more recent research has tended to add nuance to this catastrophic scenario.

INTERVIEW
EMELINE BAUD
Founder of Befocus-Hr, Coaching Company specialized in acccompaniment and transition

"Emotional intelligence will work hand in hand with AI"

Digitization and artificial intelligence lead to a rethink of business and company organization. How are businesses addressing these changes?
Having aroused as many fears as fantasies, artificial intelligence and digitalization are no longer science fiction. They have become a reality in our daily lives. In this area, the challenge for companies is to define how best to use these innovative technologies to remain competitive and differentiate themselves from the competition while ensuring that the talents and skills necessary for this transition are identified and present within their organization. The difficulty of mapping the jobs of tomorrow (up to 2030) complicates the issue.

To what extent do you think AI and digitization will disrupt entire sectors of our economy?
To consider the impacts of these technologies is essential, since it is obvious that some trades will disappear, whilst others will emerge or change. At first, it is a question of identifying those tasks we can automate and/or which will benefit from AI. Then, we need to define the skills needed for this transformation and check their existence internally. If they do not exist, it will be important to train employees and recruit new profiles. Currently, several generations are working together in companies, and for the leaders, combining these talents and creating a culture of collaborative enterprise will be crucial to success in this new era. HR departments will also have to reinvent themselves to adapt to this change. The switch to digital technology, and robotization will demand recourse to emotional skills such as creativity, and communication .... In short, human and emotional intelligence will work hand in hand with AI.

INTERVIEW
LAETITIA HAURET ET LUDIVINE MARTIN
Researcher, Labour Market department & Team leader of the Personnel & Behavioral Economics unit in the Labour Market department, LISER

“The challenge will be to regulate the impact of artificial intelligence on the job market”

In your opinion, will artificial intelligence and digitisation make people obsolete for certain jobs?
It is important to differentiate between the tasks and the job. If some tasks can be easily achieved by robotisation and artificial intelligence thus making the human obsolete, other tasks will resist and associated trades will see their content evolve. Routine trades are those for which the human being risks being easily obsolete, the associated tasks being easily automatable. Service jobs (sales, human services, administrative, ...) will certainly see their content evolve under the effect of the automation of certain tasks. On the other hand, the human remains necessary in skilled and highly qualified trades where the required knowledge is, at least in the medium term, difficult to codify and therefore difficult to automate. Digitisation is also creating new trades, such as big data professionals, and will continue to create new ones. Finally, digitisation is above all a process that increases economic efficiency. The challenge for the public authorities in the coming years will be to regulate the impact of artificial intelligence on the labour market to redistribute the gains equitably.

Will we still be able to speak in the future about quality of life at work?
Digitisation can contribute to a better quality of life at work by freeing workers from certain tasks and improving transparency within companies. However, negative effects are to be feared if this revolution is not well controlled (right to the switch off, redesign of management, ...). For workers in technology-dependent jobs, psychosocial risks are expected to increase because of increasing psychological demands, isolation and diminished self-reliance. For workers in positions that are complementary to recent technologies (skilled and highly qualified jobs) infobesity and hyper-connectivity may jeopardize their health and their work/family balance. Finally, the emergence of Uber-type digital platforms raises the question of the unbalanced balance of power between multinational companies and the self-employed to negotiate good working conditions. The regulator and the unions will have a decisive role to play on this issue.

03.

It is estimated that 65% of current schoolchildren will have a job that does not yet exist; which is hardly surprising considering that people born in the mid-1980s now work as data scientists, social business investment analysts, developers, change managers, blockchain specialists, corporate social responsibility directors, Zumba teachers, Instagram models, gluten-free chefs, wellness coaches or social media managers - many highly sought-after jobs that did not exist during their school years.

To the question “will innovative technologies precipitate the end of work?” The sincerest answer seems to be: “Neither yes or no, quite the contrary ... though perhaps!”

But if the impact of innovative technologies on the future of jobs is uncertain, it is worth remembering that there is currently no tangible sign of technological unemployment in the global economy.

Many countries (USA, Japan, the Netherlands, Germany) are close to full employment. The unemployment rate in the eurozone - which has created more than 7 million jobs since 2013 - has gone from

03. Despite certain claims, there is currently no real consensus on the impact that robotics, artificial intelligence or the spread of ICT will have on future employment.
04. If studies on the effects of innovative technologies on employment do not always agree, there is a relative consensus, at the moment, that in the foreseeable future workers will not be "replaced" but "displaced" into different activities often requiring new qualifications.

04.

12% at the height of the crisis to less than 9%, whilst the vacancy rate within the EU (2%) is higher than pre-crisis levels. Companies respond to surveys that recruitment of qualified personnel is problematic more often than that they need to reduce the number of employees with a view to automate. China created more than 66 million urban jobs between 2013 and 2017, and in Luxembourg there are nearly 150,000 recruitments a year (out of a total salaried population of 405,000, illustrating the dynamism of the labour market). Everywhere productivity gains have been almost non-existent - which means that jobs have been created even though economic growth has been relatively weak.

The use of industrial robots seems generally favourable to employment[2]. As a result, since 2000, industrial employment has been more resilient in highly robotic countries (Germany, Korea, Japan) than in others which are less so (United Kingdom, France, Italy)

Apart from the number of future jobs, we need to consider the types of jobs created. Some argue that, given the possibilities offered by the digital world (collaborative economy, networking via platforms, etc.), being a salaried employee would become (or is already) an obsolete form of work to be supplanted by self-employment. In reality, this is not the case … yet.

Despite the all-out (and welcome) promotion of entrepreneurship in all developed countries, self-employment has declined in all OECD countries, except the United Kingdom and the Netherlands since 2000. Luxembourg is one of the countries where this proportion is particularly low (6%). Assuming that over the next 12 years, self-employment was to increase in Luxembourg at the pace seen in the United Kingdom and the Netherlands between 2000 and 2016, it would reach between 8% and 10% by 2030, which is still a good deal lower than the level in the mid-1980s (12%).

It seems that the public's belief in the supposed irresistible rise of new forms of "on demand"[3] employment is out of proportion to the rather modest reality. Collaborative platforms generated the ▶

… and others yet to appear …

With the advent of innovative technologies, the advance of digital and artificial intelligence, futuristic prophecies abound. What effects will these innovations have on jobs, will they create or radically transform them? Among the professions that do not yet exist, some studies speculate and invent … we could see the emergence of animal cloners or human geneticists, virtual judges to unclog courts, manufacturers of shuttles and space stations, memory erasers, controllers and storekeepers, hackers of the human spirit, mediators for robots, managers of drone garages … or to feed everyone on this small planet, entomophagist specialists of insect cuisine …

… What if we distributed a basic income?

The introduction of a basic income for all to combat the "Uberisation" of work and to modernise social protection is sometimes mentioned. However, myriad studies conclude that it would be likely to significantly degrade the situation of the "middle class" if it were to be spending neutral, or too expensive to finance1. In sum, despite its theoretical appeal to fight against poverty and the lack of recourse to social minima, basic income remains a false clever idea.

(1) See : Muriel Bouchet (2016), *«Allocation universelle à la luxembourgeoise: un cadeau empoisonné?» (Universal benefit, Luxembourg style: a poisoned chalice?*

05.

equivalent of 0.2% of EU GDP in 2015[3], online labour markets represent less than 1% of total employment in the EU, and only 2.3% of eurozone employees have jobs considered precarious[4]. In Luxembourg, the temporary loan of labour, a new form of employment introduced in 1994 and currently included in Article 132-1 of the Labour Code, is relatively confidential. In general, permanent employment is the most usual form of work in the Grand Duchy, as only 6% of all employees (excluding temporary workers) have fixed-term contracts. Beware however!

THE IMPORTANCE OF TRAINING

If studies on the effects of innovative technologies on employment do not always agree, there is currently a relative consensus that in the foreseeable future workers will not be "replaced" but "repositioned" into different activities often requiring new qualifications. Training therefore becomes a very important aspect of future employment. In a context in which innovative technologies proliferate, but where training organisations have sometimes been slow to adapt in providing the skills needed to use the latest technologies, lifelong learning and the acquisition of skills through practical experience become priority objectives. This presents a triple challenge.

First, it will be necessary to guarantee that the active population can acquire the necessary skills updates to adapt to technological changes - particularly older workers who will be a growing proportion of the future workforce. Several welcome initiatives include the Digital skills bridge in Luxembourg, which aims to promote the digital qualification of employees and allow the reconversion of those who may be forced by necessity to reorient themselves into other trades; the House of Training's courses for job seekers registered at Adem; the Win-Win initiative and the Chamber of Commerce's "Talent Check".

Secondly, it is also necessary to aim to promote women's involvement in courses leading to priority professions (science, technology, engineering and mathematics) which may experience skills deficits. Whilst 7% of men work in Luxembourg's ICT sector, fewer than 1% of working women are in that sector. The future of employment in ICT which will provide many direct jobs is an imbalance that must be corrected if the shortage of computer skills increases.

Finally, it is important to promote learning amongst students to reduce the risk of a mismatch between supply and demand for skills by combining training and employment. The logic of vocational training for young people is even more important

Photo: Triptaptoe.com

06.

because some essential skills related to the latest technologies have not been taught at school but acquired through work experience.

Luxembourg's labour market is already marked both by a considerable number of professions in transition and by a prominent level of employment turnover. Since this is expected to continue in the future, focusing on training should allow people, whether by desire or by necessity, to change employment more frequently.

THE IMPORTANCE OF COMPETITION

The third industrial revolution has seen the emergence, in a variety of innovative sectors, of an economy based on "superstar" companies: GAFAM (Google, Amazon, Facebook, Apple, Microsoft) in the United States and BATX (Baidu, Alibaba, Tencent, Xiaomi) in China which, thanks to their capacity for innovation and the fact that they serve global and integrated markets, are "nibbling" at market share in sectors far removed from their core business. This tendency to concentrate market share, creating fear of a "winner takes it all" dynamic, is likely to shape the future of work. We note that while overall productivity stagnates, there is a great divergence between the most productive firms which continue to generate significant productivity gains ▶

05. Training will have a key role in the future of employment. It will also be necessary to promote women's involvement in courses leading to priority professions in science, technology, mathematics or engineering.
06. Will the switch to robotisation, by creating new, less arduous jobs, focus attention of work making greater use of human intelligence?

INTERVIEW
MARIE-HÉLÈNE MASSARD
CEO, AXA Luxembourg and AXA Wealth Europe

"The insurers of tomorrow will be "hybrids""

How does the arrival of digital technology re-deal the cards in the insurance business?
Digital technology gives insurers the opportunity to offer their customers a richer relationship experience. This will result in new risks to be covered, increased customization of offers, better quality of service and greater flexibility in interactions. Our customers have become aware of the risks related to digital technology, for example their reputation on social networks and piracy. Solutions to cover these risks have been created. The wealth of data available through digital technology also makes it possible to better analyse risks and customise offers to customer profiles. Thanks to innovative technologies, insurers can offer services that are more accessible, simpler and more responsive. Customers can access all their insurance information and interact via mobile applications 24/7. Another example: the AXA Group launched Fizzy. By relying on blockchain technology, if your plane is more than two hours late, Fizzy will refund you instantly. The challenge for our customers is to give them the flexibility of a human or digital interaction according to their needs..

What will the "insurers" of tomorrow look like?
The insurers of tomorrow will be "hybrids", both digital and human, more "pre-insurers", who are as concerned with preventing risks as covering them, and partnership will be a pillar of their culture.
The development of interconnected objects, the mass of data collected and interactions via apps will make it possible to improve risk prevention models and to apply them in practice. This applies to equally well to both health and natural disasters.
Anticipating risks, bringing them under control and minimising their consequences is a strategic challenge for the sustainable development of our companies. This transformation will not be led by insurers alone: they must form partnerships with fresh players in the insurance ecosystem, such as Assurtech. With the development of prevention and services, insurers will have to create a partnership with their clients.

INTERVIEW
EMMANUELLE RAGOT
Wildgen S.A. – BARRISTER

A great opportunity for companies to evolve

In the digital age, as part of your job, how do you see the world of work evolve?
Digital technology impacts on all sectors including law firms. It forces us to rethink our business model to adapt to this (r)evolution. Internal management and customer relations are influenced by artificial intelligence: phasing out of paperwork, automation, communication media, ... everything must go faster. We need to review and modernise all IT management and communication tools so that they become real sources of value especially in the context of the Data Protection Regulation and its application next May. Businesses today can communicate with customers via virtual meeting rooms, access real-time information, work on files from across the world without the constraints of working hours and streamline certain work processes. The digital (r) evolution is a terrific opportunity for companies to evolve if it is well understood, accompanied and framed ethically. It offers the employee freedom of movement unprecedented until now and allows, more and more, to put collaboration and sharing at the centre of work for the benefit of customers, employees and the company.

There are already start-ups that have positioned themselves in the civil and commercial law market by offering high-performance AI search engines.

In your opinion, will judicial decisions ever be made by "virtual judges"?
Currently, AI-based computer systems that answer legal questions calculate probabilities based on associated questions and similar cases already tried and produce a response based on this research. This system, known as predictive justice, is used by some firms, particularly to encourage clients to move towards amicable solutions. The risks of replacing court decisions with this type of machine are obvious: by relying on precedent, these systems limit the development of the law, particularly the underlying intellectual reflection that is essential to any change in jurisprudence and the construction of rights and evolving norms; the human and symbolic dimension of trials would disappear, swept away by algorithmic predictions. Artificial intelligence must remain a means of facilitating and perfecting the work of the judge, especially in congested courts, but must not be intended to replace him. In all subjects, a solution to legal problems requires the added value of the human spirit – be it the magistrates' or lawyers' instructions, the intuition to develop strategy in accordance with our customers' business culture, knowledge of the applicable rules and diverse types of logical reasoning – rather than automatic decisions that could have negative consequences.

07.

and others who lag. These differences in productivity – which explain the pay differential between those who work for superstar firms and those who don't – arise because many companies have failed to successfully adopt innovative technologies and best practices. The initiatives by Luxembourg's government (lower taxes for SMEs, aid to RDI, support for SMEs, Fit 4 innovation, etc.) and professional chambers (Letz shop, Go digital, etc.) are therefore welcome. By offering all companies in the Grand Duchy (start-ups, small businesses, large companies) the opportunity to fully embrace the third industrial revolution and adopt innovative technologies, Luxembourg is working to shape a future of work which minimises the risk that the most productive employees would be monopolised by the most productive firms.

THE RISK OF POLARISATION

As new technologies are biased towards the most qualified workers who have skills that can be combined with "machines", there is a "hollowing out"[5] of employment that risks creating a polarised labour market in the future. There is strong demand both for highly qualified employees (in health, new materials, education, finance) and for low-skilled workers (personal services), but between the two, jobs requiring "average" skills are under pressure and workers in these sectors are threatened with being 'downgraded' to low-skilled services. This dynamic is considered one of the main factors explaining wage inequalities and could, if it should continue, lead to a

07. By offering all companies in the Grand Duchy the opportunity to fully embrace the third industrial revolution and adopt innovative technologies, Luxembourg is working to shape a future of work.
08. Increased digital penetration into our lives, with robots and computers, where it is possible to see everything, hear everything and collect infinite amounts of data, also creates fear of losing control and more frequent cyberattacks.

Photos : Stevanovicigor, iStock par Getty Images

08.

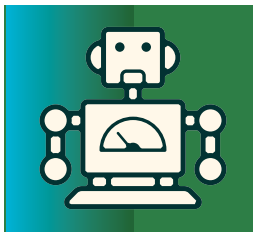
future of growing inequality in work. Since the dispersion of salaried remains more contained when the supply of skilled workers increases, training (mentioned above) to improve employees' qualifications is an objective ally against the risk of polarisation. The development of new economic sectors offering intermediate jobs (such as the industrial sector in the past) and the revaluation of low-skilled service sectors should also make it possible to avoid the impoverishment of employees in the future This is vital if we wish to avoid social (discontent) and economic problems (lower average income, weak demand for businesses, stagnant productivity, etc.).

RISKS OF DIGITAL DISTRACTION AND CYBERCRIME

While 70% of the new jobs to emerge since 2010 in the OECD are in the digital domain, the importance of digital technologies to future employment should not decline as an ever-increasing range of sectors use and incorporate them. In addition to changing future working habits, productivity of employees could be affected by a "waste of effective working time" to social networks, and lead to a situation where it would be difficult to limit the working day should digitisation generate widespread tele-availability. Additionally, this greater penetration of technology into our lives, going hand in hand with a growing number of interconnected objects in the workplace is enough to raise fears of cyber-attacks … and hope for rapid growth in the number of jobs related to cyber security.

It seems important to put fears about the imminent end of work into perspective given the uncertainties about automation's impact on employment. However, we mustn't be naive. Since technology is not employment-neutral, it is up to public authorities and social partners to shape the future of work by providing appropriate responses in terms of training, support for SMEs and competition policy 2.0., new social rights, and investment (public and private) in those sectors of the future which offer employment to the greatest number and ensure that man and technology remain compatible. It should be noted that, in some respects, the current demographic trends (aging of the population and the related budgetary cost) will shape the future of the Grand Duchy's economy and labour market far more than technological developments. In short, the future of work in Luxembourg will not depend so much on artificial intelligence but on human intelligence and on the ability to "tame" and "utilise" new technologies to address the socio-economic challenges that will arise in the Grand Duchy. ●

(1) See : *Merkur* janvier / février 2017.
(2) See : European Commission (2016), *Analysis of the impact of robotic systems on employment in the European Union.*
(3) Source : Eurofound (2015), *New forms of employment.*
(4) See : *http://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20180209-1?inheritRedirect=true&redirect=%2Feurostat%2Fweb%2Fmain%2Fhome*
(5) See : Eurostat, *Labour Force Survey.*



And if we taxed robots?

Assuming a lack of employment and the robotariat replacing the salariat, it is sometimes argued that taxing robots and/or distributing a basic income would be a solution to consider. Whilst this may seem attractive, these recommendations run counter to reality. Taxing robots is tantamount to taxing investment, which is economically dangerous and risks preventing an economy from taking advantage of the opportunities offered by robotisation to modernise its productive apparatus, and because a need for equality that could lead to ubiquitous situations such as taxing the use of food blenders and vacuum cleaners.

High Five

In the detachable poster at the end of the magazine you will find an invitation to the Chamber of Commerce's trade show in 2072, welcoming experts to present their trades … of the future.