

ARTIFICIAL INTELLIGENCE: THE FUTURE OF LABOUR AND EMPLOYMENT

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Abstract

There are two principal currents of opinion about the *future of labour*: those who think the advance of Artificial Intelligence (AI) will destroy professions, provoking mass technological unemployment, and those who think that, as has happened before in the history of labour, new technologies like AI will create new jobs. The fact is that AI will have a profound impact in the world of labour. The article is organized in three parts: first describing AI in the context of the Fourth Industrial Revolution; then exploring AI's potential threats and opportunities in the world of labour. The text is concluded with an *ethical* question: Does AI offer the possibility of thinking about a new paradigm of labour and of civilization? The Fourth Industrial Revolution must be put at the service of humanity and not of the market. The choices of the present will dictate the directions of the future of labour.

Keywords: Artificial Intelligence; Employment; Fourth Industrial Revolution; Future of Labour; Market; Pope Francis; Universal Basic Income

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Introduction

These are times of great technological leaps. A technological revolution could be defined as a powerful group of technologies, products and new industries, capable of shaking the economy and boosting an era of development. In the twenty-first century, we are in front of a gigantic number of technological innovations. In this context, artificial intelligence (AI) is highlighted as the most important, because it places us in the frontier between the man and the machine.¹

Robotics and Artificial Intelligence are invading the system of production and will dominate all the markets soon. Since the time of Alan Turing,² AI as a science seeks to establish the basis for the development of techniques destined to provide machines autonomy. However, already in the Industrial revolution of the eighteenth century, machines started to perform labours previously done by humans. As long as the technology advances, more jobs will be delegated to machines.

The influence of AI increased in the post-World War II period. Since then, it has never stopped growing. AI has as its objective the simulation with machines of each of the distinct faculties of human intelligence: cognitive functions, learning, calculation, perception, and memorization. Since the last years of the nineties, AI has been united with robotics and human-machine interfaces. Since 2010, the power of machines permits the usage of data intelligence, Big Data.³ The automatic learning techniques of the industrial production chains are always becoming more automatized. All the applications of AI influence almost all sectors of the economy.

The new technologies impact the world of labour as a whole, in industry, commerce and services.⁴ However, AI is modifying the way labour and its organisation are structured. As the agrarian sector lost its strength in the passage of the traditional society to the

¹ Carlota Perez, *Revoluciones tecnológicas y capital financiero. La dinámica de las grandes burbujas financieras y las épocas de bonanza*, México: Siglo XXI, 2004, 32.

² Alan Turing (1912-1954) was influential in the development of computer science and in the formalization of the concept of algorithm and computation. He was also a pioneer in artificial intelligence and computer science.

³ Jean-Gabriel Ganascia, <https://es.unesco.org/courier/2018-3/inteligencia-artificial-mito-y-realidad>. Ganascia is a member of the European Association of Artificial Intelligence (EurAI), and of the Institut Universitaire de France and chairman of the Ethics Committee of the National Center for Scientific Research in France.

⁴ Charles Freeman, Luc Soete, *Cambio tecnológico y empleo: una estrategia de empleo para el siglo XXI*, Madrid: Fundación Universidad-Empresa, 1996, 69.

industrial society, now, with AI, we are living through the passage of the industrial society to the technological society of intelligent robots.

Is AI a threat or an opportunity to the worker? Does its introduction in the system of production and services provoke a reduction in the number of jobs to the point that could bring about an end to human labour? Or, on the contrary, will AI drive the rise of employment and income? What are its negative consequences for human labour? Unemployment, precariousness and social exclusion? What could be the opportunities to the world of labour offered by AI? Could we risk making some predictions about the future of labour?

1. AI and the 4th Industrial Revolution

Industry 4.0, an expression utilized by Klaus Schwab⁵ in the Davos Economic Forum in 2018, points to a change of paradigm in the labour world. An industry is a particular process of transforming a material to tradable products. When a great change in this process occurs, there are global social, economic and political impacts. The word *revolution* is appropriate, because it denotes abrupt and radical changes, like those generated by the invention of agriculture or the steam engine. Like AI, the system has reached a fourth phase. It isn't a random revolution, but a revolution that unites intelligence and machine with global impacts in the social, cultural, economic and political realms.

E-economy and technology of knowledge (*Artificial Intelligence*): Each day more companies increase their productivity and expand their markets by using this resource. AI also reconfigures models of public management. The number of new professions created after every technological innovation impresses.

The first reference is found in Karl Marx's *Grundrisse*. The *Fragment about the machines*⁶ is a foundational theoretical explanation of the context of humans and technology. Marx recognizes the role of knowledge in production and qualifies it as *general intellect*. That is, the union between the economic system and knowledge has existed since the industrial revolution, when production started to incorporate science and technology with human labour. This

⁵Klaus Schwab, *The Fourth Industrial Revolution*, Geneva: World Economic Forum, 2016.

⁶Karl Marx, *Elementos fundamentales para la crítica de la economía política*, vol 2. Madrid: Siglo XXI, 1979, 216-230.

development had been prepared by the approach of Illustrated Scientific Positivism that applied knowledge to the domain of nature. Since then, knowledge has fulfilled a preponderant role in the process of controlling nature and of labour.

The First Industrial Revolution changed all the systems of production and accelerated processes that had formerly been done by hand, starting with the use of coal, steam and iron. With production reaching standards never seen before, the British became the principal industrial power.

The Second Industrial Revolution began in the middle of the nineteenth century, spurred by the innovations of electricity, chemistry and petrol. The period was marked by widespread access to manufactured technologies like airplanes, refrigerators, canned foods and telephones.

With the Third Industrial Revolution, starting in the second half of the 20th century, information became the most important raw material. Automatization and the new technologies of information and communication increased the speed of scientific processes revolutionizing all areas of industry. It was the digital revolution.

The Fourth Industrial Revolution, or Industry 4.0, will be totally automated from systems that combine machines with digital process (“smart factory/smart manufacturing”). There are waves coming from multiple places simultaneously: nanotechnology, renewable energy, genetic engineering, quantum computing, etc. The Fourth Industrial Revolution is defined as the transition to new systems built on the infrastructure of the digital revolution. The technologies are not restricted to the universe of nanotechnology, neurotechnology, biotechnology, robotics, artificial intelligence and energy storage.

The whole society receives the impacts of the Fourth Industrial Revolution. This is why it is a new paradigm of production that enables the advance analytics of data and of the human-machine interface; the internet of things that allows machines to communicate; intelligent artifacts; 3D printer and robotics. Machines now exist in a network that allows them to ‘talk between themselves,’ that combines the physical world with the virtual world.

2. AI and Labour

AI may cause fears of the changes it can bring about. At the beginning of the 1980s, robots appeared as a tool of the production line of many industrial branches. Many feared that it would cause

loss of jobs and increase inequality, with a few fortunate people that would benefit while another group would be left behind.⁷ There was talk, moreover, of the end of human labour.⁸

The processes of technology change happen every sixty years, approximately.⁹ AI brings many challenges to the world of labour. Today, we are entering a new period when the combination of distinct technologies is configuring a new industrial revolution. Optimistic and fatalistic views imagine antagonistic futures.

It is certain that it will be impossible to escape from technology. The workforce is more hybrid. People and robots are already working together. Could the robots someday take the place of humans? The nightmare that the machines could come to take jobs from humans usually comes back every time there is a technological revolution.

AI makes the coming decades even more complex. It is a technology capable of accomplishing operations comparable with the human mind. It could, moreover, become more efficient and cheaper than the flesh and bone worker. Human beings are tied with a set of formal regulations on labour—like salary, labour, workday, rest, health, productivity—with characteristics that at the same time make them purely human—feelings, opinions, friendships, family, consciousness.

2.1. Threats

The principal threat to the worker is to lose his labour and his income.

Technology in a general way, and the neoliberal orientation of the markets, are increasing labour shortage for all workers. Human labour has been gradually eliminated from many sectors of production. New technologies are projected to respond to the interest of capital. A minority is enjoying the benefits of technological advances. Machines are performing diverse professional activities. In this context, it is inevitable that AI also eliminates jobs and make different specializations obsolete, intensifying social inequality.

⁷Benjamin Coriat, *El taller y el robot. Ensayos sobre el fordismo y la producción en masa en la era electrónica*, Madrid: Siglo XXI, 1993.

⁸Jeremy Rifkin, *El fin del trabajo: Nuevas tecnologías contra puestos de trabajo: el nacimiento de una nueva era*, Barcelona: Paidós, 1996; Andre Górz, *Adieux au Proletariat - Au Delà du Socialisme*, Paris: Galilée, 1980.

⁹Pérez, *Revoluciones tecnológicas y capital financiero*.

AI is altering the labour outlook substantially as long as it accelerates the automation of many tasks, according to the Brookings Institution.¹⁰ In the United States more than 36 million jobs are “very exposed” to automation. Besides that, 70% of the roles can be done by machines. Cooks, waiters, supermarket cashiers, stockers, couriers, will have to change their line of work as an example. Banks, factories, restaurants and hotel services will be affected. The changes will mostly hit the young. The fear of losing a job to a robot will also affect qualified professionals. Almost half of financial sector workers, as an example, fear losing their job to AI.¹¹

Technology is rendering some professions obsolete more quickly than others. This is the case of translators, book and article reviewers, telephone operators, telemarketing, sport referees and domestic workers. Human salespeople can be easily substituted by robots. Soon, we will be attended by ophthalmologists, dentists, nurses, orthopaedists and other medical specialists who are robots. Machines outperform the human being in precision, speed, resistance and in information handling.

In this context, workers in impoverished regions like Latin America will face numerous obstacles.¹² Many of them do not possess the qualifications and preparation demanded by a top technology like AI. Many companies prefer to continue paying low salaries than to invest in innovation.¹³ For AI to be inclusive, workers in poor countries need training. Otherwise, the crowd of the digitally disconnected will increase even more. Technological inclusion is required to fight poverty, unemployment and underemployment.

Millions of workers are exposed to the effects of the Fourth Industrial Revolution. The impact on unemployed persons’ quality of life, beyond severe, will fall principally on workers who perform

¹⁰ Brookings Institution, <https://www.brookings.edu/project/artificial-intelligence-and-emerging-technology-initiative/>.

¹¹<https://es.eos-solutions.com/en/press/European-Payment-Practices-2019.html>

¹² International Monetary Fund (IMF) DataMapper: Unemployment rate. <<https://www.imf.org/external/datamapper/LUR@WEO/OEMDC/ADVEC/WEOWORLD>> International Federation of Robotics, *Executive Summary World Robotics 2018. Industrial Robots*. https://ifr.org/downloads/press2018/Executive_Summary_WR_2018_Industrial_Robots.pdf, 15.

¹³Banco Interamericano de Desarrollo, *El futuro del trabajo en América Latina y el Caribe. ¿Una gran oportunidad para la región?* 2018, Em <<https://publications.iadb.org/es/el-futuro-del-trabajo-en-america-latina-y-el-caribe-una-gran-oportunidad-para-la-region-version>>, 9.

routine tasks in the service sector and on underpaid manufacturing workers.

The major part of AI usage is developed in China, Japan, the US, and Germany. Predictably, its benefits will go to the richer countries, while the costs of unemployment will fall to younger, poorer and less qualified populations. The unemployed will be a part of an army created by its own technologies, since use, control and knowledge of technology are controlled by capital and not labour.

2.2. Opportunities

We have seen that AI presents several challenges to the future of work. But AI also offers opportunities. Let us consider some of them. Self-driving vehicles, algorithm negotiation in the stock market, and medical diagnosis are examples of processes where AI has the potential to raise quality, efficiency, and productivity and income levels. Robots are offering the skills that companies seek in people.

The introduction of new technologies could mean, not a general reduction in employment, but a sectorised reduction in fields where these technologies are introduced. New technologies could also generate jobs in other sectors. According to Manoel Castells, “A structural systematic relation between the diffusion of new technologies and the evolution of the employment level in the economy does not exist. What occurs is that jobs are dislocated while new abilities are created.”¹⁴

The money saved in the use of labour is not exclusively due to the machines, but above all, to the model of organization. To defend structural unemployment for merely technological reasons is to ignore the ethical ambiguity in the use of new technologies in production. Technology is not a natural phenomenon. The restructuring of the production is linked to the ideological and political context. The use of technologies also strengthens the neoliberal capitalistic orientation of the market.

The effects of AI on labour depends much on the orientation that is given to the use of this technology. It is not AI that forces the business owner to accumulate capital, but the need to be competitive. The economic context where new technologies are inserted cannot be ignored. AI is an advanced form of computing that, conjugated with

¹⁴Manoel Castells, *La era de la información. Economía, sociedad, cultura*, vol. 1. La sociedad en red, Madrid: Alianza, 2001, 320.

robotics, can exponentially increase productivity and quality in many sectors of the economy, since it optimizes the execution of tasks trusted to human beings. The machines not only could do routine tasks, but could develop more advanced activities with lower costs. The evolution of AI towards the so called “Artificial Intuition” will allow machines to have processes of analytical thinking similar to those that the human brain does, to interpret human emotions and act as a consequence.

AI generates economic growth, increases profit margins, reduces prices and increases demand, at the same time it creates new jobs that make up for the ones that disappear.

It is true that Industry 4.0 can eliminate millions of jobs around the world. Even if the general perception is pessimistic, this phenomenon doesn't impact everyone in the same way. Take, for example, the United States, one of the countries with more investment in AI. In 2017, this country increased the incorporation of robots by 6% in relation to 2016, and reduced its unemployment rate.¹⁵

An investigation made by the Future of Humanity Institute¹⁶ of the University of Oxford analysed the achievements of AI and its future potential. In 45 years, intelligent robots will be more skilful than the humans in many tasks, in both efficiency and quality. In 74 years, almost all possible tasks will be done exclusively by machines.

2.3. What Jobs will Continue to be Human?

AI will not be capable of replacing humans entirely, no matter how much it advances. Works that require special attention on the part of the human mind like professionals of mental health, occupational therapists, social workers, supervisors, experts on emergency managing and everything that involves human sciences will continue to be performed by humans.

Jobs centred on the use and development of the technology will remain human as well. New machines create new opportunities for

¹⁵International Federation of Robotics, *Executive Summary World Robotics. Industrial Robots*, https://ifr.org/downloads/press2018/Executive_Summary_WR_2018_Industrial_Robots.pdf, 14. A similar phenomenon occurred in Germany. During 2010-2015, jobs increased from 93,000 to 813,000 in the automotive sector, and 93,000 robots were installed in the same period.

¹⁶Future of Humanity Institute. *When Will AI Exceed Human Performance? Evidence from AI Experts*, <https://arxiv.org/pdf/1705.08807.pdf>.

technicians and programmers and industries created by the technology. The labour demand will be centred in functions like data analysts and scientists, software and app developers, specialists in AI, experts in automation process, and robotics engineers.

The introduction of a technology that automates and executes tasks previously done by human beings can create jobs. Freelance work and the gig economy are based on jobs that are done sporadically, such as flexible delivery drivers using apps to connect with customers. Crowdsourcing is a group of workers that, even in distinct places of the world, offers the companies the possibility of developing projects any time of the day.

Jobs in social media will continue to be done by humans. “Influencers” utilize digital platforms like YouTube or Instagram to share videos and photos. The number of followers is an important source of income and publicity. Activities that involves goods and services generated in arts, drawing, music, fashion, craftwork and diverse forms of culture, tourism and entertainment will continue to be human. The platforms and the systems of innovation give support to the creativity associated with aesthetics, to the aspect of the goods and services and the emotional changes that these products create in the consumer.

AI is a way to help human beings have a better performance and finish a task more easily, more quickly and with less use of energy that could be spent in another activity. It is a human responsibility to make machines work better. Depending on the situation, humans rely on technology to make tasks more efficient.

Historically, the quality of human life increased thanks to the development of techniques and technologies. The systems of artificial intelligence are a very valuable complement to civilization. Digital technologies based in AI can help wider sectors of the labour market increase their productivity and access better-remunerated jobs, contributing to a more inclusive development.

3. Projections and Challenges

3.1. Protection of the Workers

For the opportunities to overcome the threats, the politics should adjust in the national and in the international sphere. Proper regulation will bring benefits for the entirety of society.

Worker should be supported in the defence of their rights. International organizations have the responsibility of preventing big corporations from dominating the market and controlling technologies in their favour. The United Nations, through the International Labour Organization (ILO), possesses the conditions to provide global level dialogues to formulate policies that establish conditions of equality between countries and companies to move toward democratization of AI. This is the role of the ILO: to secure the universality of human rights to workers through the right to decent work and the respect of labour rights.

Actual labour legislation soon will be modified. Traditional concepts like workplace, work day, labour contract, flexibility, will give place to new realities legislated with different legal forms and regulated with other norms of legal safety. However, labour laws will continue to be necessary to balance the interest of the companies and of the workers' rights.

3.2. New Professional Abilities

Education and formation should go beyond academic teaching and adjusting young people to a professional qualification. Countries should make permanent learning a reality so that everyone can benefit from AI. It is necessary to guarantee access to new technologies for everyone.

What kind of labour is demanded by the new technologies, what capabilities and how should workers be learning? Digital ability is linked to a group of technical, cognitive and socioemotional capabilities that allow the person to adapt to the digital world. Creative thinking, complex human interactions and socioemotional skills are key abilities for the future of labour.

3.3. Investment in People

Companies and governments have an essential role in the process of social inclusion of the workers and the respect of their rights. One of the principal concerns is social inclusion through socially useful labour for populations on the periphery. Education is necessary so that impoverished workers can acquire technological capabilities.

The labour market demands a more qualified, creative and prepared working class to face the rapid global changes. The abilities of today will probably become obsolete in a few years. That is why it is so important that governments and companies invest in solutions that favour human labour.

Good professionals in human resources are essential to the creation of a suitable environment so that the companies and workers of the future can navigate the uncertainties of the labour market.

3.3 Universal Basic Income

Like any other innovation, AI requires a time of adaptation and transformation of the old structures. A massive increase of unemployment could destabilize entire societies. People depend on work to survive.

The world holds more than 200 million unemployed. This figure could reach 500 million if we include the underemployed. More than 650 million workers live in conditions of extreme poverty.¹⁷ A report from Oxfam, “Dignity not destitution,”¹⁸ shows that between 6% and 8% of the population, more than 600 million people, are at risk of entering poverty.

A tax on the robots can guarantee the resources to offer a universal basic income as a solution to the lack of wages for those unemployed by AI. The economic growth accompanied by technological advancements will allow consumer goods to be accessible to all, and cheaper. It is self-evident that “jobs for all” is not a solution. To guarantee the subsistence of the species and a fairer distribution of wealth, it will be necessary to create a universal basic income.

On Easter Sunday 2020, Pope Francis, in a letter directed to the world’s social organizations and movements, reinforced the proposition of a “universal basic wage which would acknowledge and dignify the noble, essential tasks you carry out. It would ensure and concretely achieve the ideal, at once so human and so Christian, of no worker without rights.”¹⁹

3.4. Morality of AI

One of the legal questions arising from AI has to do with autonomy. Should robots be held accountable for their actions? Robots do not fit in the existent juridical categories. Will another legal category be created for the smart robots?

¹⁷ ILO. International Labour Organization, <https://news.un.org/en/story/2020/01/1055651>

¹⁸ Oxfam, <https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620976/mb-dignity%20not%20destitution-an-economic-rescue-plan-for-all-090420-en.pdf>

¹⁹ Pope Francis, http://www.vatican.va/content/francesco/en/letters/2020/documents/papa-francesco_20200412_lettera-movimentipolari.html

Machines do not have moral autonomy, because they do not have liberty and conscience. The laws of robotics written by Isaac Asimov in 1950 in the book *I, Robot*,²⁰ could serve as an inspiration: 1). A robot may not injure a human being or, through inaction, allow a human being to come to harm; 2). A robot must obey orders given it by human beings except where such orders would conflict with the First Law; 3). A robot must protect its own existence as long as such protection does not conflict with the First or Second Law; 4). A robot may not harm humanity, or, by inaction, allow humanity to come to harm.

Maybe an obligatory insurance of civil responsibility can be required for the robots, similar to automobile insurance, to recognize the dual responsibility of the maker and the owner. Taxes can be charged for the use and profits of AI and reinvested in the qualification of young people and in funds of universal basic income.

Conclusion

Machines with artificial intelligence present a series of economic, social, political and ethical questions. But, in the first place, AI raises an anthropological question that obliges us to reflect about our identity, about what makes us human beings. AI will surpass our cognitive faculties in many of the spheres of human action.

We cannot anticipate changes, but we need to try. Progress will become the result of a process of social reflection. Do we want machines to make crucial decisions? If our objective is to have a digitalized society that makes life easier, will that make us happier? Will we be submitted to behaviour dictatorship? Who is controlling this change?

The risks are not limited to the scarcity of labour or the precariousness or socioeconomic exclusion of millions of human beings. AI brings consequences for individual autonomy, especially for human freedom. Overcome by its creature, the creator, that is, the human race could be replaced by increasingly more intelligent machines in the future.

It is almost impossible to know with certainty the consequences of the Fourth Industrial Revolution. Many factors prevent the establishment of correlations with a high grade of precision about

²⁰Isaac Asimov, *I Robot*. New York: Doubleday, 1950, 40.

the impact in the world of labour. New technologies, like AI, modify the organization of production and consumption, they revolutionize the traditional productive sectors and reconfigure all the labour market.

To liberate people from dangerous and heavy jobs is an advancement for humanity. If AI saves one human life when indicating a medical treatment after analysing clinical data, evidently this is positive.

Massive unemployment would be unsustainable. Unemployed people seeking jobs that don't exist, extreme inequality, despair and fear lead to social conflict. No one would wish for social upheaval. The lack of remunerated labour demands solutions before it is too late. The history of civilizations shows that human beings work to live more and better. Maybe, with AI, humanity will have the opportunity to live more and better working less.

Could the increasing efficiency of intelligent machines in the production and distribution of goods and services help to engender a more humane and sustainable society? Universal basic income, as a mechanism of guarantee of the human rights, could be a solution in a society where paid work is an exception.

Pope Francisco teaches that "the whole social pact is built around the world of work."²¹ But what is work? To the Pontiff, "work is the fundamental element to the dignity of the human person... means bringing bread home... is the first patrimony of a society." Therefore, societies must prevent capitalism from exploiting this crisis, because its vital principle is profit and not the dignity of the worker.

So that AI will not be treated like an enemy of the workers, societies must invest in health, education, and food security for workers so they can have access to the jobs created by the new technologies. Political institutions and civil society need to ensure that new contracts don't remove rights from the more vulnerable and marginalized workers, particularly women and black people.

Work means much more than a job. Human labour comes from the persons created and assembled in the image of God, called to collaborate with God in the work of creation. The value of labour is, in the first place, its capability of providing dignity to those who

²¹ Pope Francis, http://www.vatican.va/content/francesco/en/speeches/2017/june/documents/papa-francesco_20170628_delegati-cisl.html.

execute it. This is fundamental to the birth of another culture of labour. It is necessary to expand the meaning of work.²²

Pope Francis, in the encyclical *Laudato si*, explains: “The real objective should always be to guarantee a dignified life through work.”²³ Integral ecology involves two aspects: the dignity of the worker and care for the environment.

The Fourth Industrial Revolution must be put in the service of humanity and not of the market. The choices of today will dictate the course of the future of labour. As the *Universal Declaration of Human Rights* insists, “Everyone has the right to work, to free choice of employment, to just and favorable conditions of work and to protection against unemployment.” (Article 23 of the *Universal Declaration of Human Rights*). With societal investments in education and universal basic income, the advancement of AI can mean the advancement, not the erosion, of human rights.

²²Élio Gasda, *Fe cristiana y sentido del trabajo*, Madrid: San Pablo, 2011.

²³Pope Francis, *Laudato si*, Roma: Librería Editrice Vaticana, 2015, n. 191.