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# **ROLE OF ARTIFICIAL INTELLIGENCE IN EMPLOYMENT FROM ILO PERSPECTIVE**

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**Barcelona, 3 de junio**

# **ROLE OF ARTIFICIAL INTELLIGENCE IN EMPLOYMENT FROM ILO PERSPECTIVE**

## **ABSTRACT**

Nowadays, one of the biggest concerns in our society is how artificial intelligence and new technologies will affect employment. In some sectors there has already been a transformation and some jobs are now being developed by machines instead of people. However, some theorists and studies conclude that artificial intelligence creates more jobs than it destroys.

This issue has been studied and discussed within the International Labour Organization (ILO), the United Nations agency which is in charge of promoting decent work and setting international labour standards. In this context, my study will focus on analysing the different issues and challenges ILO proposes in order to cope with the impact of the technological progress in the world of work.

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## INTRODUCTION

As a starting point, it is convenient to explain what artificial intelligence consists of. Artificial intelligence can be defined as “*The theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages*”<sup>1</sup>. This term came up for the first time in 1956 by John McCarthy<sup>2</sup>. In this sense, Mc Carthy proposed the development of a new programming language to provide intelligence to machines.

But, in what way has AI affected employment in the last years? Some studies such as “*Jobs Lost, Jobs Gained: Workforce Transitions in a time of Automation*”<sup>3</sup> published by the McKinsey Global Institute (MGI) conclude that by 2030 automatization will affect 14% of workforce. However, other experts such as Patrick Winston (AI professor at Massachusetts Technological Institute)<sup>4</sup> sustain that machines are far from having the ability to understand the world well enough to make predictions about the basic aspects of it. In this way, they affirm that there are important limits, so there are good reasons to expect that human work will be necessary for a long time.

If we put an eye in its evolution, employment has suffered big changes since the Industrial Revolution (s.XVIII): new technologies in cotton weaving, iron and steel production and transportation created for the first time a sustained increase in labour productivity<sup>5</sup>

The second transition happens in the twentieth century, bringing the bulk production, with the appearance of factories and assembly lines.<sup>6</sup>

The end of the twentieth century brings a new transformation: the development of electronics and computer science in industrial processes which enabled the automation production lines with machines which replace people in repetitive tasks.

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<sup>1</sup> English Oxford Living Dictionary.

<sup>2</sup> Vaidyeswaran Rajaraman (2014). *John McCarty-Father of Artificial Intelligence*.

<sup>3</sup> McKinsey Global Institute (2017). *Jobs Lost, Jobs Gained: Workforce transitions in a time of automation*.

<sup>4</sup> Patrick Henry Winston (2017). *AI and Future of Work: Intelligent Automation: Opportunities and Challenges (MIT Initiative on the Digital Economy)* <https://www.youtube.com/watch?v=XBxsFXip4bY>

<sup>5</sup> Antonio Garell, Llorenç Guilera (2019). *La Industria 4.0 en la sociedad digital*. p 21-23. Marge Books

<sup>6</sup> Antonio Garell, Llorenç Guilera (2019). *La Industria 4.0 en la sociedad digital*. p 23-26. Marge Books

Finally, nowadays we can describe a new organisational model known as of Industry 4.0 which controls the value chain throughout manufacturing systems by the use of technologies of information.

Dizzying advances in internet technology have produced a radical impact on economy and society. The convergence of information technologies with robotics are transforming the traditional internet into “internet of things” (understood as the set of technologies which facilitate digital transformation)<sup>7</sup>. This new scenario applied to industry has produced a disruptive impact on it, but at the same time, has opened big opportunities based on the use of information technology.

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<sup>7</sup> Luis Lombardero (2015). *Trabajar en la era digital: tecnología y competencias para la transformación digital*.

## 2. ILO AND FUTURE OF EMPLOYMENT

### 2.1 WHAT IS ILO AND ITS IMPORTANCE ON LABOUR

The ILO (1919) is the organization part of the United Nations in charge of promoting labour rights worldwide. The particularity of this institution is its unique structure formed by government representatives, employers and workers.

Among its principle aims there is the promotion of employment and minimum standards, the extension of social protection and the enforcement of social dialogue. In other words, it has the main objective of promoting decent work for everyone (the productive occupation justly paid and exercised under freedom, security and respect for human dignity conditions<sup>8</sup>).

Among the tools this organisation uses to assume its goals, we can highlight policies, programs and global campaigns, international labour standards, cooperation programs and research actions. In this way, an important feature is the Global Pact of Employment, which consists of a series of political measures that must be implemented by the member states to ensure the well-being of workers<sup>9</sup>.

In terms of its functioning, we must highlight, on the one hand, the International Labor Conference (ILC), bringing representatives of governments, employers and workers together once a year to discuss labour and social issues and in this way adopt new international standards of work. On the other hand, we must also mention the Administrative Council, which is the executive tripartite ILO body, which meets three times a year in Geneva. However, it's especially important mentioning the Global Commission on the Future of Work, which has the job to undertake an in-depth examination of the future of work<sup>10</sup>.

In this way, the ILO, as the most important institution in terms of labour rights, has been aware of the new technological revolution and what this means to the evolution in a worldwide dimension. For this reason, the ILO's general director (Guy Ryder) proposed "the initiative about the future of work" with the aim of establishing the challenges and objectives we have to deal with in the future in labour terms<sup>11</sup>.

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<sup>8</sup> Mission and impact of the ILO (Ilo.org). <https://www.ilo.org/global/about-the-ilo/mission-and-objectives/lang--en/index.htm>

<sup>9</sup> About the Pact (Global Jobs Pact) (Ilo.org) <https://www.ilo.org/jobspact/about/lang--en/index.htm>

<sup>10</sup> Global Commission on the Future of Work (Ilo.org) [https://www.ilo.org/global/topics/future-of-work/WCMS\\_569528/lang--en/index.htm](https://www.ilo.org/global/topics/future-of-work/WCMS_569528/lang--en/index.htm)

<sup>11</sup> Guy Rider (2015) *The future of work centenary initiative* (Report of the Director-General). Chapter 1.

In my study I will analyse the different development of studies, reports and theories that have arisen in the sphere of this organization concerning new technologies, and, specifically, artificial intelligence and its impact on the labour as it has been evolving in the last decade.

### **2.1.1 FUTURE OF WORK INITIATIVE**

In 2013, the ILO director, Guy Ryder, proposed a Report setting out the long-term challenges for the ILO as it approached its centenary. This report was a starting point for what is today one of the seven initiatives to face the ILO's centenary in 2019<sup>12</sup>.

In 2015, the general director made a report explaining the concept of this “future of work initiative” and proposes a three-stage implementation plan. The first stage consists in inviting a group of 3 participants (tripartite constituents, international organisations, universities and member estates), asking them to contribute to this initiative<sup>13</sup>.

The second stage would consist in the establishment of a commission (currently the Global Commission on the Future of Work) responsible for examining the results of the centenary conversations and developing them. And finally, in 2019 the third phase would commence where all Member States would be encouraged to organize events such as forums and meetings to discuss matters related to the centenary of the ILO.

In 2017 the event “The Future of Work We Want: A Global Dialogue” took place in the International Office on 6-7 of April. After this meeting of more than 700 people, which examined the future of work in order to gain a better understanding of the organisation of work, a report was made with the summary of discussion<sup>14</sup>. It's mentioned that it was suggested that the ILO must help developing a labour regulation on artificial intelligence.

For 2019, it's expected that all Member Estates organize events to discuss the report of the commission. In this way, there will be a 2019 International Labour Conference with the possible adoption of a Centennial Declaration.<sup>15</sup>

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<sup>12</sup> Guy Ryder (2013). *Towards the ILO centenary: Realities, renewal and tripartite commitment* p.28

<sup>13</sup> Guy Rider (2015) *The future of work centenary initiative* (Report of the Director-General).

<sup>14</sup> ILO (2017). *A future of work we want: A global dialogue*

<sup>15</sup> Global Commission on the future of work (2019) *Work for a brighter future* p 55



### 2.1.2 THE CASE OF SPAIN: NATIONAL TRIPARTITE CONFERENCE

In Spain, a tripartite commission was formed in 2016, composed by the Ministry of Labour, Migration and Social Security, the business organizations CEOE and CEPYME and the trade union organizations CCOO and UGT, with the assistance of the Office of ILO for Spain. This commission was created with the aim of promoting debates about the future of work.

In 2017, the I National Tripartite Conference took place in Madrid (“The future of the work we want”)<sup>16</sup> in the framework of the centenary of the International Labour Organisation. This emerges from the idea of responding to the difficulties arising from the transformation process of our society. This group (formed by tripartite constituents, academics and interested parties) is invited to discuss on the future of work regarding: work and society, decent work for all, the organisation of work and production and work governance.

As a result of this first conference, the debates within this conference have been reflected in a book comprising two volumes, the first of which includes the Conference agenda, the speeches by the King of Spain and the Director of the ILO, among others. The second volume comprises the academic contributions to the conference of the four discussions that structure the debate.

Inside this second volume<sup>17</sup> the scholars highlight the idea that the future of work will develop following 10 main trends including that one according to which “intelligent software, robotics, big data and artificial intelligence will destroy millions of jobs but will also generate professions of high qualification that nowadays don’t exist”.

In March 2019, the II National Tripartite Conference took place, in which social partners, autonomous regions, members of the Economic and Social Council and academics debated about the future of work.<sup>18</sup>

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<sup>16</sup> Conferencia Nacional Tripartita (2017). *El futuro del trabajo que queremos*. [https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-madrid/documents/genericdocument/wcms\\_554191.pdf](https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-madrid/documents/genericdocument/wcms_554191.pdf)

<sup>17</sup> Conferencia Nacional Tripartita (2018). *El futuro del trabajo que queremos*. Volumen II. Organización Internacional del trabajo.

<sup>18</sup> OIT(2019). *El Presidente de Gobierno, Pedro Sánchez y el Director General de la Organización Internacional del Trabajo, Guy Ryder, inaugurarán en Madrid la II Conferencia Nacional Tripartita “El futuro del trabajo que queremos”* [https://www.ilo.org/madrid/eventos-y-campa%C3%B1as/WCMS\\_674034/lang-es/index.htm](https://www.ilo.org/madrid/eventos-y-campa%C3%B1as/WCMS_674034/lang-es/index.htm)

### 3. WHAT IS ARTIFICIAL INTELLIGENCE AND ITS EFFECT ON EMPLOYMENT

Before analysing what challenges the ILO proposes regarding the future of work due to the evolution of artificial intelligence, we must first explain which effects artificial intelligence has on employment according to experts and relevant institutions in this field.

In 2016, the United States White House made a report explaining how IA could enhance economic growth generating new kind of jobs and improve the efficiency of many businesses<sup>19</sup>. However, it also pointed out the negative effects such as the destruction of jobs and the increase in income inequality. This report highlights the idea of how existing jobs are rapidly changing and aims at promoting the awareness of adopting education and labour policies that address the difficulties of workers displaced by technology<sup>20</sup>

According to the Gartner's consulting group study, AI will create more jobs than it will destroy. Concretely, artificial intelligence will promote 2.3 million new jobs until 2020, although it will eliminate 1.8 million jobs. This analysis also details that, from 2020 until 2025, two million more jobs will be created.<sup>21</sup>

But other scholars and experts don't agree with such position. Kai-Fu Lee<sup>22</sup>, president of the Institute of Artificial Intelligence Sinovation Ventures, believes that inequality will increase due to artificial intelligence. He concludes we need to find out what jobs can't be carried out throughout artificial intelligence, and, in this way, train employees to carry out jobs which cannot be substituted by AI. For this, it's necessary to reinvent education and vocational training.

In opposition to this, the Conference of Directors and Deans of computer engineering (CODDII), which is constituted by experts who lead computer engineering in Spanish universities, made an report<sup>23</sup> where they conclude that overall reduction in industrial employment is not evident. In their inform *Industry 4.0 digital transformation in industry* they

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<sup>19</sup> Executive Office of the President (2016). *Artificial intelligence, automation, and the economy*

<sup>20</sup> David Rotman (2017). "El ritmo implacable de la automatización" (y el futuro del empleo). MIT Technology Review. <https://www.technologyreview.es/s/6783/el-ritmo-implacable-de-la-automatizacion-y-el-futuro-del-empleo>

<sup>21</sup> Stamford, Conn. (2017). *Gartner Says by 2020, Artificial Intelligence will create more jobs than it eliminates*. <https://www.gartner.com/en/newsroom/press-releases/2017-12-13-gartner-says-by-2020-artificial-intelligence-will-create-more-jobs-than-it-eliminates>

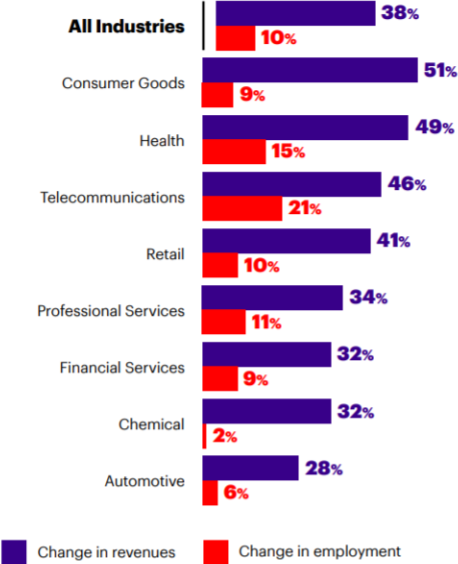
<sup>22</sup> Kai-fu Lee (2018). *Dejen de fingir que la inteligencia artificial no va a destruir el trabajo*. MIT Technology Review <https://www.technologyreview.es/s/10013/dejen-de-fingir-que-la-inteligencia-artificial-no-va-destruir-el-trabajo>

<sup>23</sup> José Luis del Val Román (2016). *Industria 4.0: la transformación digital de la industria*.

defend that experience indicates that increase in labour productivity leads to new jobs. In this same line, as the value of service and innovation are imposed on the labour cost new jobs will be linked to new technologies and design of products and services.

This entails a change in demand: semi-qualified jobs will decrease, and new highly qualified jobs will be created, mainly linked to information technologies. In this sense, they follow the same line that Kai-Fu Lee supports: university training will be required, providing computer engineers with knowledge of technology based on the new industrial model.

In statistical terms, it's important to highlight the international macro-survey prepared by Accenture Strategy<sup>24</sup>, an organisation who collaborates with companies in terms of technology and digitalisation, which concludes that the impact on employment will, in fact, be positive. This report reveals that 2/3 of Spanish companies surveyed a net growth of their workforce over the next three years.



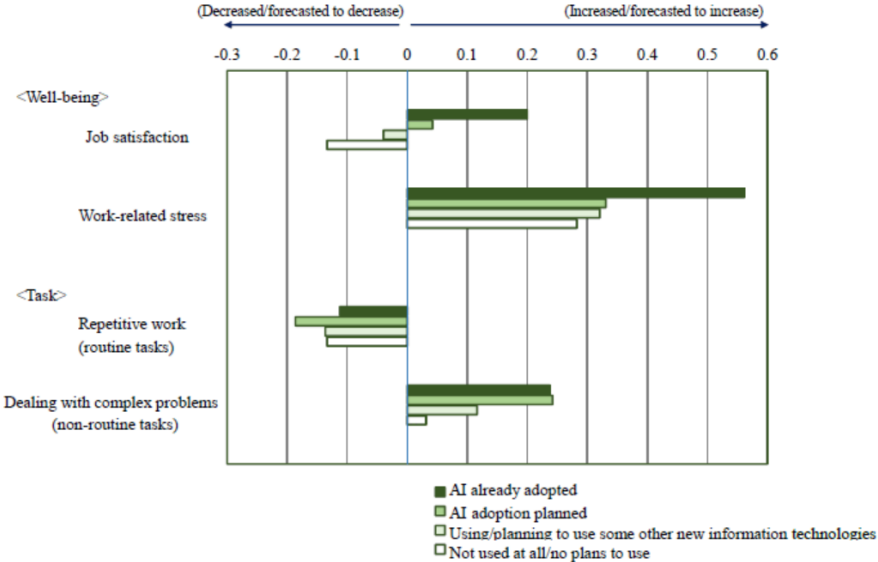
Source: Accenture Future Workforce Study 2017

Even more, as seen by the previous graphic the collaboration between AI and humans will give new economic value. According to Accenture Strategy, a greater investment in artificial intelligence could raise the income of organisations by 38% by 2022 and increase employment by 10%.

<sup>24</sup> Ellyn Shook and Mark Knickrehm. Accenture Strategy (2018). *Reworking the revolution*.

However, this study concludes in the same way than the other scholars mentioned: employment will be created, but it must be reconfigured. Almost the half of the surveyed employers recognize that some jobs are becoming obsolete. In this context, Accenture provides several recommendations such as “reinventing” jobs, taking advantage of the existing staff and investing in new capabilities.

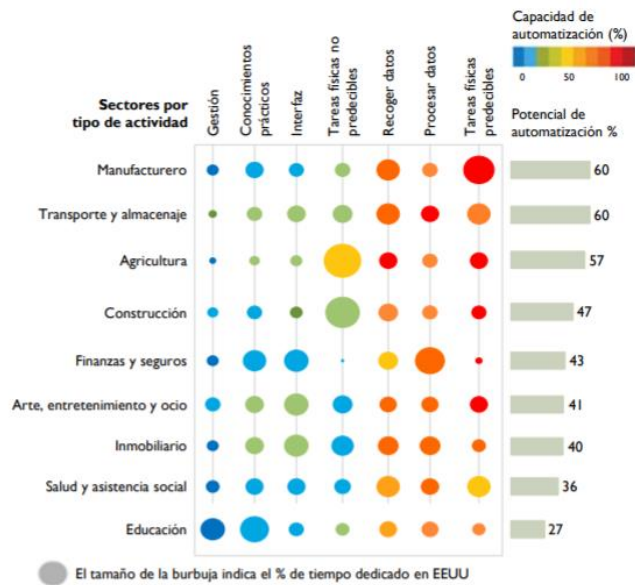
Regarding the positive effects of AI on employment a study was made by the Investigation institute of science and technology for Japan’s society<sup>25</sup>, in which the situation of 10.000 employees was analysed. This report explains that artificial intelligence can improve job satisfaction by, for example, allowing humans to do more motivating tasks, leaving tedious tasks for robots. This report concludes that once humans are released from repetitive tasks, employees will be happier in their positions since they will feel more satisfied when they face greater challenges.



Source: JST-RISTEX Planned Survey Report for Fiscal 2017

In the same way, according to a report made by the OECD (Organization for Economic Cooperation and Development)<sup>26</sup>, the most vulnerable jobs are the most repetitive ones, affecting administrative and manual jobs. In this way, people with fewer qualifications have a higher risk of losing their jobs. To defend these arguments, the authors used a study made by McKinsey where the sectors which have a higher risk of been automated are specified.

<sup>25</sup> Isamu Yamamoto (2019). *The impact of AI and information technologies on worker stress*  
<sup>26</sup> Ignacio de la Torre, Leopoldo Torralba (2017) *La disrupción tecnológica ya está aquí*



Source: US Bureau of Labor Statistics; Mc Kinsey Global Institute analysis

The authors of this report try to give response to the question if new jobs will be created in an equal proportion to the jobs that are being destroyed due to artificial intelligence. For them, the answer is affirmative. In this sense, technological advance brings creation of new jobs that have to do with the creation, development and supervision of artificial intelligence technologies. However, the speed of creation of new jobs generated by technology is not proportional to that at which old jobs will be destroyed.

The European Trade Union Institute (ETUI) have also given an overview of the new possible effects on the labour market and working conditions that AI will bring<sup>27</sup>. In their report regarding impact of digitalisation on the labour market, the author Christophe Degryse considers that the effects of technology on employment and, particularly, labour conditions are not precise. However, what is clear is that digital revolution brings inequalities between workers due to the replacement that Big data and robots entail, as they carry out complex and non-routine jobs. To sustain this conclusion, he summarises various authors studies in the following table.

<sup>27</sup> Christophe Degryse (2016). *Digitalisation of the economy and its impact on labour markets*

Jobs at greatest risk of automation/digitalisation	Jobs at least risk of automation/digitalisation	New jobs
Office work and clerical tasks	Education, arts and media	<b>'Top of the scale'</b>
Sales and commerce	Legal services	Data analysts, data miners, data architects
Transport, logistics	Management, human resources management	Software and application developers
Manufacturing industry	Business	Specialists in networking, artificial intelligence, etc.
Construction	Some aspects of financial services	Designers and producers of new intelligent machines, robots and 3D printers
Some aspects of financial services	Health service providers	Digital marketing and e-commerce specialists
Some types of services (translation, tax consultancy, etc.)	Computer workers, engineers and scientists	<b>'Bottom of the scale'</b>
	Some types of services (social work, hairdressing, beauty care, etc.)	Digital 'galley slaves' (data entry or filter workers) and other 'mechanical Turks' working on the digital platforms (see below)
		Uber drivers, casual odd-jobbing (repairs, home improvement, pet care, etc.) in the 'collaborative' economy

Source: Christophe Degryse (ETUI 2016)

From these results we can conclude that new technologies bring unemployment for the less and medium-skilled occupations which can be replaced by robots and algorithms. However, robotics and automatization will benefit software developers, engineers and jobs which require specific qualifications and skills. For this reason, the author considers that our skills are “lagging behind”.

#### 4. HOW ILO LOOKS AT ARTIFICIAL INTELLIGENCE

According to the Global Commission on the Future of Work<sup>28</sup>, technological advances (including artificial intelligence), will bring the creation of new jobs. However, people who lose their jobs may not be prepared for seeking new opportunities. This is because future jobs will not coincide with the abilities required for the jobs nowadays.

In this way, ILO consider that AI will create new jobs if we adopt sustainable practices. Nevertheless, other jobs will disappear in this process as long as “*countries scale back their carbon and resource intensive industries*”.<sup>29</sup>

Furthermore, ILO deems that changes in demographics are also important with this regard. This is because “*expanding youth populations in some parts of the world and ageing populations in others may place pressure on labour markets on labour markets and social security systems*”.

<sup>28</sup> Global Commission on the Future of Work (2019). *A work for a brighter future*

<sup>29</sup> Global Commission on the Future of Work (2019). *A work for a brighter future (page 11)*

In this way, it concludes that we need to seize the opportunities which emerge from these technological changes.

Within the scope of operation of the Global Commission on the Future of Work, there are a series of studies on specific studies on topics which are of the Commission's interest (The Future of Work Research Paper Series). These have the aim to support the Commission's work to provide decent work.

The ILO's research department analyses the implications for the future regarding artificial intelligence (*The economics of artificial intelligence: Implications for the future of work*)<sup>30</sup>. In their Paper, Erns, Merola and Samaan paper discuss the concern of job losses and raise whether the technological change would bring inequality and tries to give a positive perspective about the opportunities and risks that artificial intelligence implies. To do so, the authors try to analyse how past technological and automation waves have had an effect on employment opportunities.

They conclude that institutions and social partners must apply the appropriate measures for minimising the risks of job-losses and inequality in the labour market. This implies political changes at an international and national level.

In this sense, these policies must provide the adaptation of work to new technological changes: education and vocational training must go forward, guaranteeing new skills to workers. However, new technologies must be spread worldwide, and social partners must avoid digital companies dominating the market for preventing these from undermining countries fiscal revenue in order to guarantee a better sharing of the benefits of the new digital economy.

Finally, they recommend the formulation of new fiscal policies to establish equal conditions between companies, guaranteeing social dialogue in order to share new technology benefits in a more efficient way.

The above position is shared by the Global Commission for the future of work<sup>31</sup> (previously mentioned) in the sense that it considers that employers and employees must redesign the conception of jobs.

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<sup>30</sup> Ekkehard Ernst, Rossana Merola, Daniel Samaan (2018). *The economics of artificial intelligence: Implications for the future of work*

<sup>31</sup> Global Commission on the Future of Work (2019). *A work for a brighter future*

In the section “technology for decent work”, the Commission highlights the importance and urgent matter of technology linked to working conditions. Even if technology can minimize hard work and reduce stress related with work-related stress, it can also reduce control capacity and workers autonomy, which could lead to loss of qualifications and decrease workers satisfaction.

For this reason, the Commission sustains that “*final decisions that affect work must be taken by people*<sup>32</sup>”, requiring a regulation of the use of data and responsibility of algorithms in the world of work. This means that the exercise of job force through algorithms should be regulated to guarantee workers dignity.

These algorithms are part of what we know as artificial intelligence. Concretely, algorithms are part of “machine learning”, which is a branch of artificial intelligence which permits systems and computers learn how to make decisions without human intervention. Concretely, these algorithms allow taking tasks in a more precise and rapid way.

In this way, the Commission indicates that we should take advantage of AI in a way we guarantee the correct supervision of working conditions, the payment of minimum salaries and social security (through decentralized databases) etc... So, governments must invest in dissemination of digital technologies in support of decent work.

At the same time, they highlight the idea that “new technologies generate large amounts of data related to workers”, generating risks to privacy. The solution they propose to cope with this issue is a regulation of the use of data and the use of algorithms in the world of work.

In February of 2018 the Commission published an issue brief prepared for the 2<sup>nd</sup> meeting of the Global Commission on the future of work regarding the impact of technology on the quality and quantity of jobs<sup>33</sup>. In this report they compare the actual technological revolution with past technological waves, when technological waves sub served qualified workers.

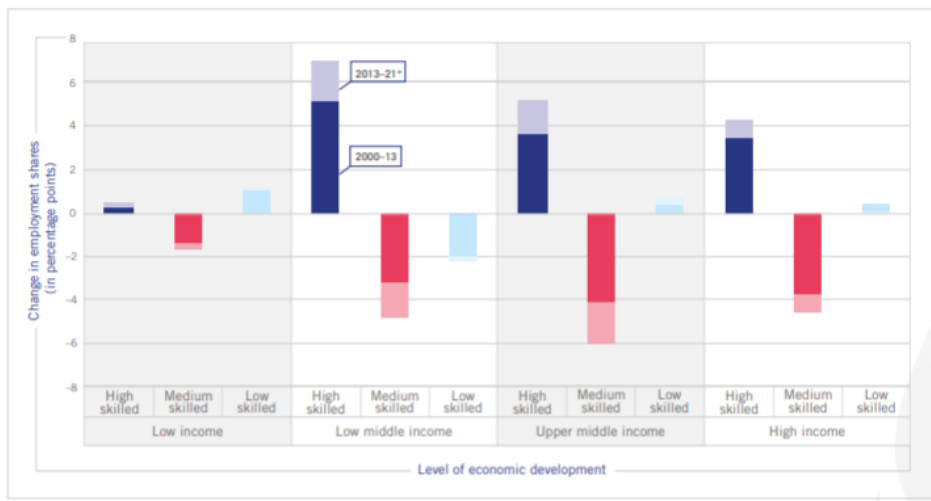
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<sup>32</sup> Global Commission on the Future of Work (2019). *A work for a brighter future* (page 14)

<sup>33</sup> Global Commission on the future of work (2018). *The impact of technology on the quality and quantity of jobs*



The Commission sustains that as jobs are being destroyed in service and manufacturing sectors, for high-skilled workers it has risen. To sustain this argument, they used a graphic made by the ILO in 2016.



Source: ILO Trends Econometric Models (2016)

According to the previous graphic, technology advantages will be enjoyed only by a small group of companies. There is a big difference between small companies which will be affected negatively by the technology changes and the large companies benefitting from them. To reduce this inequality, effective policies have to be approved in order to acquire new skills, as there is an existing risk of low skill and, consequently, low paid jobs.

The Tripartite National Conference also proposes the adjustment and new regulations to allow the contribution of robots with social security and universal income for jobs robots will destroy. In this way, they conclude that public policies and business strategies are essential to govern changes in the digital transformation of jobs.

## 5. SCHOLAR'S OPINION ON THE RELATIONSHIP ILO- AI

José Manuel Salazar-Xirinachs, regional ILO director for Latin America and the Caribbean analyses the changes in employment new technologies are causing. In this sense he distinguishes four types of risks and impacts of technologies in the labour market. First, the acceleration of the dynamics of destruction and creation of employment, on the second hand, the acceleration in the obsolescence of existing competencies in jobs and demand for new skills.

Thirdly, the risk of inequality and finally the acceleration of change in business models and new ways of contracting.<sup>34</sup>

In this sense, the author proposes some measures for facing these challenges. In the first place, he highlights that a revolution in education is required: this would contribute to job creation and the creation of quality jobs in the new digital economy. Secondly, he proposes the installation of productive development policies which accelerates investment, productivity and adoption of technologies to boost job creation. Finally, the adoption of labour market policies in order to redesign the labour market institutions and regulations.

Irmgard Nubler<sup>35</sup>, senior economist at ILO, believes that automation of production processes destroys jobs, but new jobs are created through product innovations. In this sense, we must manage adjustment processes to create new jobs.

She also tries to give an answer to the existing mechanisms to make these adjustments. For her, distribution of productivity gains a critical role. This is because productivity generates more demand which entails higher salaries and lower prices. Thanks to this, markets can expand and, consequently new jobs can be created.

In Spain, Joaquin Nieto<sup>36</sup> (ILO director for Spain) looks at the challenges new technologies bring for the future of work. In particular, he highlights five principle challenges we must take into consideration: safety in employment, income, schedules and work hours, lack of protection and increase in the incidence rate associated with safety and health at work.

To face these future challenges, he also proposes some policies to consider. Firstly, he proposes policies regarding equality for all workers, including number of hours and controlling the atypical forms of employment. Secondly, he proposes supporting collective bargain by strengthening trade unions enrolment in order to represent these atypical forms of employment, where women are overrepresented.

According to Nieto, adopting social and employment policies to create jobs and reconcile needs of workers such in training but also in caring for children and the elderly. It is also crucial to expand social protection on working hours, salary and employment contracts. These topics must

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<sup>34</sup> José Manuel Salazar-Xirinachs (2018). *Cambio tecnológico acelerado e impactos en el mundo del trabajo: ¿qué hacer?* [https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---sro-lima/documents/statement/wcms\\_626248.pdf](https://www.ilo.org/wcmsp5/groups/public/---americas/---ro-lima/---sro-lima/documents/statement/wcms_626248.pdf)

<sup>35</sup> Irmgard Nübler (2016). *New technologies: A jobless future or a golden age of job creation?* [https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms\\_544189.pdf](https://www.ilo.org/wcmsp5/groups/public/---dgreports/---inst/documents/publication/wcms_544189.pdf)

<sup>36</sup> Joaquin Nieto (2017) *Tendencias laborales y el futuro del trabajo*

be contemplated by policies that guarantee a minimum social protection for workers. Finally, in order to renew social protection, fiscal policies must be strengthened in order to redistribute the benefits increase of productivity will bring thanks to technological revolution.

In the same way, Maria Luz Rodriguez Fernandez<sup>37</sup>, expert in labour law and social security, and in the sphere of the Tripartite National Conference, also talks about the measures we must adopt in order to mitigate the damages of this job destruction. On the one hand, she proposes a new model of vocational training for workers, increasing people with digital skills and technology specialists. In this way, we must start a process of professional reconversion of workers skills.

However, this need for specialization and vocational training is required in specific fields which have been traditionally occupied by men (engineers, science and technology)<sup>38</sup>. This situation can affect women and their possibilities of access in the labour market. According to Blasco, this existing gap in access to use of technologies will reduce the development and transformation of women’s living conditions.

<b>Mujeres</b>	<b>TOTAL</b>	<b>219.257</b>
	Ciencias Sociales y Jurídicas	126.788
	Ingeniería y Arquitectura	20.510
	Artes y Humanidades	20.430
	Ciencias de la Salud	41.184
	Ciencias	10.345
<b>varones</b>	<b>TOTAL</b>	<b>169.454</b>
	Ciencias Sociales y Jurídicas	79.609
	Ingeniería y Arquitectura	51.983
	Artes y Humanidades	11.805
	Ciencias de la Salud	16.957
	Ciencias	9.100

Source: Instituto de la Mujer y para la Igualdad de Oportunidades

Esperanza Macarena Sierra Benítez<sup>39</sup> mentions it’s important giving response to business needs in quality digital skills to carry out a transformation in education and vocational training to provide the best adaptation to a new digital society. Moreover, women must be prepared to integrate technological careers in order to avoid labour differences between sexes.

<sup>37</sup> María Luz Rodríguez Fernandez (2017) *Clásicos y nuevos desafíos del trabajo en la economía 4.0*  
<sup>38</sup> Elena Blasco (2017). *Mujeres y precariedad en nuevos entornos laborales*  
<sup>39</sup> Esperanza Macarena Sierra Benítez (2019) *¿las nuevas tecnologías influyen en la discriminación o la van a eliminar? El empleo 4.0 desde una perspectiva de género*

Regarding artificial intelligence and challenges on the future of employment, Theresa Ballister and Adam Elsheikhi highlight the position of Frey and Osborne<sup>40</sup>, who argue that technological progress will lead to jobs losses and lower wages as systems are substituting labour workforce. According to these experts, job losses will affect low and middle-skilled administrative workers. They also add the idea of the increase of job polarisation in developed countries.

Further proposals to face the challenges artificial intelligence imply employment have been mentioned by other scholars. For instance, Martin Ford<sup>41</sup>, expert on artificial intelligence and robotics sustains we are in full growth of technology and this leads to fewer jobs because robots and algorithms perform better at work than workers. In this context, he also proposes a universal basic income in order distribute wealth better.

This basic universal income (UBI) has the aim of guaranteeing minimum living standards for all, irrespective of employment status, in order to strengthen the bargain position for workers. For instance, Rodriguez highlights that even if we apply a new model of vocational training, it's necessary to apply measures in order to cover the incomes of workers who will be left without jobs.

Ballister and Elsheikhi refer to this idea in their working paper. They make the distinction between some authors who sustain that an UBI is necessary in order to compensate unemployment, on the one hand, and critics of the UBI who argue that it's politically and financially infeasible, on the other hand. Finally, the authors conclude by mentioning a study where it is demonstrated that UBI provides a superior protection to workers despite potential moral hazard implications and fraudulent claims.

However, Valerio di Stefano, also highlights the risks regarding employment rights and not only income risks<sup>42</sup>. For this reason, the basic universal income is not enough. For the author, regulation against discrimination, working time, privacy and control against abusive practices on workers is necessary through legal norms.

In di Stefano's opinion, artificial intelligence and automation ease discriminative practices. For this reason, "*a regulation is needed to prevent abuses that imperil human dignity*". The author

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<sup>40</sup> Carl Benedikt Frey and Michael A. Osborne (2013). *The future of employment: How susceptible are jobs to computerisation?*

<sup>41</sup> Martin Ford (2016). *El auge de los robots: la tecnología y la amenaza de un futuro sin trabajo.*

<sup>42</sup> Valerio di Stefano (2017). "*Negotiating the Algorithm*": *Automation, Artificial Intelligence and Labour Protection*"

highlights the importance of the implications of worker's representatives at an international level. In this way, ILO is a very important party, together with governments, who have to suggest regulation on future issues on the labour market, workers, trade unionists and HR personnel.

Karl H. Ebel<sup>43</sup> has a different opinion in this aspect: in his opinion, robots improve working environments, limiting the exposure of workers to arduous conditions. However, robots also cause injuries throughout control errors or inadequate operational procedures etc. For this reason, the author mentions the ILO's *Encyclopaedia of Occupational Health and Safety*, which includes some guide-lines in the use of robots. For instance, "feed and removal apertures must be designed to prevent manual or physical access to areas which are hazardous as a result of automatic movements"<sup>44</sup>. Nevertheless, the harmonisation of national standards in this theme is necessary. The ILO report on safety and health<sup>45</sup> also refers to the necessary design and implementation of appropriate safety measures and the establishment of safety principles for the use of robots.

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<sup>43</sup> Karl H. Ebel (1986). *The impact of industrial robots on the world of work*

<sup>44</sup> ILO. *Encyclopaedia of Occupational Health & Safety*. <http://www.iloencyclopaedia.org/part-viii-12633/safety-applications/58/safety-principles-for-industrial-robots>

<sup>45</sup> ILO (2019). *Safety and health at the heart of the future of work*

## 6. CONCLUSIONS

Different studies predict that millions of jobs could be partially or fully automated and replaced within a few decades due to robots and artificial intelligence's progresses. Consequently, robotics revolution will have an impact and it is affecting employment and labour law. This impact will not only affect the quantity of jobs but will also have effects on quality of these.

The ILO, as a guarantor of labour protection at a global level, is aware of the impact that new technologies is having in labour relations and indeed, the ILO promoted at a global level and in order to cope with the challenges for the future of labour relations.

According to this organisation and scholars, it's important to advantage of the possibilities offered by the transformations our society and labour market is facing. For this, a permanent training for workers is necessary through a system financed by social funds.

It's likely that technological changes will lead up to an accelerating job destruction. To create new jobs in this context, new markets need to be regulated in order to guarantee workers' rights. However, this process must be quick to avoid jobs being lost due to the substitution of artificial intelligence systems.

Regarding quality of jobs, technology could lead to a displacement of middle-class workers and increase wage inequality, especially in women. According with this idea, ILO have highlighted the importance of restructuring the education system and vocational training in a way that workers can adapt easily to the job-transformation and invest on capacities to adapt to a new restructuration of work as we know it nowadays. In the same way, governments must adopt policies in order to guarantee protection against job destruction and its consequences.

In conclusion, the result of technological changes and its impact on employment depend on how adjustment processes are managed. ILO gives a positivistic perspective in this way, encouraging countries to establish appropriate policies in order to take advantage of technological advances.

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