



Facultad de Ciencias Económicas y Empresariales

THE IMPACT OF ARTIFICIAL INTELLIGENCE IN ENTERPRISE'S WORKFORCE: RISKS AND OPPORTUNITIES FOR WORKERS

Autor: Herberto Gut Lladó

Director: Raúl González Fabre

MADRID | Junio 2023

Abstract

Artificial intelligence (AI) is becoming an essential component of companies' workforce, leading to its adoption across various businesses. These technologies are becoming increasingly important inside companies due to their potential to increase efficiency and improve productivity by integrating things like predictive analytics, automation, and supply chain optimization. The rise of these technologies demands that companies must incorporate these mechanisms into their workflow and invest in cultivating and seeking employees that are capable and equipped with the necessary skills to thrive in this technological era.

This paper conducts an analysis of the impact of artificial intelligence on companies' workforce and provides future foresight, trends and solutions brought by these technologies. Through the collaboration of the National Observatory of Technology and Society (ONTSI), the International School of Digital Innovation (ISDI), and two different companies representing two distinct financial sectors: information technology and security solutions & services, this work provides a first-hand view of the implementation and utilization of AI as a labor resource, and how it is affecting the workforce of multinational companies such as Indra and Prosegur. This study will acknowledge the advancements and contributions brought about by these technologies, as well as the requirements and potential limitations associated with their use.

Keywords

Artificial intelligence (AI), robots, technologies, workforce, employees, workflow.

Table of Contents

1. Introduction	1
1.1. General Framework	1
1.2. Objective	2
1.3. Methodology	2
2. Artificial Intelligence (AI)	4
2.1. Origins	4
2.2. Characteristics and functionality	5
2.3. Types of AI	6
2.4. Limitations and problems	8
3. Application of AI on company's workforce	11
3.1. AI as a labor source and the Luddite views	11
3.2. Impact on businesses and on its workers	13
3.3. Sectoral view of AI's impact on workforce	14
3.3.1. ONTSI and ISDI institutional point of view	14
3.3.2. Impact on security solutions workforce: Prosegur	20
3.3.3. Impact on information technology (IT) solutions: Indra	24
4. Consequences of AI for the workforce	27
4.1. Risks	27
4.2. Opportunities	29
5. Conclusions	32
6. Bibliography (APA)	34

1. Introduction

1.1. General Framework

The advancements of artificial intelligence in the business field are currently transforming and will revolutionize the way in which companies' labor force operate. As we shift to an increasingly digital world, companies around the world are being forced to transform and innovate technologically. The impact that this technological outburst is having on most companies is immense. The most affected asset, within companies, by this digital transition is the labor force. With the ability to collect and analyze vast amounts of data in real-time, as well as to inform of the most productive course of action in a chain of operations, the application of these technologies in a company's workflow is starting to displace human workers as AI is becoming fundamental to maintain competitiveness.

As new technologies are transforming the business landscape, firms are employing AI tools into their systems at exponential rates. Enterprises are investing large amounts of money to incorporate these technologies into their infrastructures. AI's potential to carry out activities that often need human-like intelligence is generating a growing interest, especially across the financial sector. Artificial intelligence is a product of computer science and engineering. It is essentially machines with intelligent computer programs that carry out tasks that would typically need human intelligence, and it is being used widely in many different industries.

These distinct technologies are affecting many different job functions due to its capability to perform a company's review in seconds by collecting and processing large volumes of data, redirecting and optimizing marketing campaigns or even improving the productivity of a worker by substituting them for a machine that has maximum precision and can be involved in high-risk interventions.

The increasing interest of these technologies in the business landscape is compelling more and more businesses to integrate these systems into their workflow. This has resulted in a significant digitalization trend in many companies, which in turn demands innovation and adaptation to keep the pace of the rapidly evolving business landscape. Businesses must

therefore focus on digitally innovating by investing in the latest and most powerful tools in order to increase proficiency and competitiveness. To ensure adequate preparation and adaptation, companies must not only be technically prepared for the upcoming changes, but also seek out employees with the necessary knowledge and skills to thrive in their roles.

As businesses continue to undergo massive structural changes, mostly due to the incorporation of technological advancements, it is inevitable that potential risks and opportunities will arise for workers. While the long-term risks and opportunities related to these advancements are still somewhat uncertain, there are currently both risks and opportunities for workers in the short-term. However, it is possible that in the future, the risks may outweigh the opportunities, making it capital for business to monitor and mitigate potential negative impacts on workers as they continue to innovate and adapt to the rapidly evolving business landscape.

1.2. Objective

The objective of this study is to analyze the impact that these technologies are having on the workforce across different companies. Furthermore, this study aims to identify the potential risks associated with the implementation of AI in the workplace, while also examining the possible opportunities that these technologies may bring. The study will also examine the ethical and social implications of these AI on the workforce and how businesses can prepare their employees for the changes being brought by the increasing adoption of AI. The study will also look at the uses of these technologies in the labor field and evaluate the possible impacts on workers, while highlighting the alternatives that organizations might use to deal with the changes brought on by these technologies.

1.3. Methodology

Regarding the methodology, this study was conducted in multiple steps. The initial phase involves the author conducting independent research, primarily using reliable internet sources to understand artificial intelligence. Additionally, other resources for research that were used include videos, books, articles, and magazines that discuss the relationship between AI and the workforce in companies.

In addition to the author's own research, an external perspective was sought to evaluate the impact of these technological advancements, their implementation in businesses, and their potential repercussions on the workforce. To achieve this, the author collaborated with two institutions and two companies that had expertise and awareness in the topic.

The two institutions that I talked to were the ONTSI, National Observatory of Technology and Society, which its purpose is to “generate knowledge of value for the public and businesses, on technological development and its different impacts on the economy, employment and public services”¹. And the ISDI, the International School of Digital Innovation, which is a “provider of education and training services intended to contribute towards digital transformation”². At ONTSI, the author interviewed two research technicians from red.es (ONTSI), José María Zavala and José Antonio León, to obtain a perspective on the matter from a governmental point of view. In contrast, at ISDI, the author met with Nera González, an Associate Professor of artificial intelligence, to gain insight from an educational institution's point of view.

For a more direct and immediate impact of the research question, the author met with corresponding individuals from each of the two companies. For Prosegur, a multinational company that offers security solutions and services, the author interviewed the Chief Technology Officer (CTO), Manuel Tarrasa, and the Corporate Director of Digitalization, Automation, and Robotics, Fernando Cisneros, to gain their perspective on the discussed matter. Subsequently, the author contacted Minsait, an Indra company, which is a global information technology (IT) services company, and interviewed Juan Francisco Gago, Director of Digital Technologies and Operations at Minsait. During this second company interview, various key topics and problematic issues related to AI were addressed and discussed, providing the author with an additional perspective on the topic.

The final stage of the methodology involved synthesizing the author's previous knowledge and research on AI and combining it with the information and understanding provided by the interviewees through their expertise and knowledge on the subject.

¹ ONTSI: <https://www.ontsi.es/es/Que-hacemos>

² ISDI Digital Talent: <https://www.isdi.education/es>

2. Artificial Intelligence (AI)

2.1. Origins

The idea of “machines that can think” goes back to the ancient Greeks. More recently, since its explosion in the 20th century, artificial intelligence has been used as a tool created to perform and personate human cognitive tasks. AI’s appearance and active use among the financial industry was originally seen many decades ago. The first work in the field of AI travels back to the mid 20th century, before World War II in 1935, with British computer pioneer Alan Turing. The first computational device intended to investigate the limitations of “automatic machines” was known as Turing's Machine.

After the war, Turing published a couple of papers on the subject, highlighting “Intelligent Machinery” as the most notable and known to all computer scientists. In that paper, the British mathematician proposed the idea of what is known today as Turing’s Test, which in simple words is a test to evaluate the capabilities and skills that a machine shows that are comparable to those of a human¹.

Later on that century, development and innovation in computer systems started to arrive, and this was one of the milestones for the exponential growth of AI. From the 1950s to the 70s, researchers such as Allen Newell, J.C. Shaw and Herbert Simon, started developing systems able to imitate human thought processes². Systems that were capable of solving mathematical problems, theorems and inference rules. General Problem Solver (GPS) was the utmost program developed by these computer scientists, consisting of a machine capable of solving problems of many different types of complexity.

From the 80s until today, AI experts have developed systems that are remarkably sophisticated, and are fully capable of making choices based on a set of rule inputs and guidelines. Consequently, machine learning was developed, which is an important application that allows AI to learn from data. Because of developments in big data and other computing technologies,

¹ *Britannica*: <https://www.britannica.com/technology/artificial-intelligence>

² *Britannica*: <https://www.britannica.com/technology/artificial-intelligence>

computer science researchers were able to develop and put to work intelligent AI systems that could perform practically any task.

2.2. Characteristics and functionality

With the intentionality of imitating human cognitive responses, AI can perform a variety of functions with an amazing level of precision. Artificial intelligence counts with multiple functionalities and uses for the modern world. In businesses, its utilization has been imminent and, in some cases, inevitable for companies to thrive and adapt to this digital transition. Many are the governmental plans that are being developed and implemented for companies to digitalize. In a near future, these technological advancements are going to be a necessity for any business to progress. Psychologists and experts in computer sciences believe that to replicate human intelligence these machines must meet a series of traits of intelligence which are; learning, reasoning, problem solving, perception, and use of language¹.

In terms of learning, there are many ways that a computer can learn to develop a math solution or to proportionate with the ideal method to take on a strategic M&A situation. The simplest and most effective form of learning for AI machines is trial and error. To exemplify, the most common illustration of this is a computed chess game. Computers have been programmed to store those errors and perfect their moves to achieve the most perfect outcome and check-mate their opponent. This trial-and-error formula is addressed today as “generalization learning”², which applies past experiences to present comparable situations.

Reasoning and problem solving are closely linked and derive from learning. Reasoning is done through inferences that can be separated into deductive and inductive. Deductive, is when a problem is set forth and the most probable, relatable and favorable answer is selected. Inductive, on the other hand, is a form of reasoning in which the answer is widely based on previously collected data. Problem solving is focused on purposely dividing all the possible events to achieve one certain goal or solution. Problem solving is divided into special-purpose and general-purpose³. The first one being an approach that is specifically designed to address a stated problem, and general-purpose being used to solve a wide range of problems.

¹ *Britannica*: <https://www.britannica.com/technology/artificial-intelligence>

² *Britannica*: <https://www.britannica.com/technology/artificial-intelligence>

³ *Britannica*: <https://www.britannica.com/technology/artificial-intelligence>

Perception is more aligned with the set of qualities that AI systems have. AI technologies are capable of decomposing and organizing things, such as text information, 3D objects and more, into different layers. The machine is instructed to recognize a variety of objects and the AI first identifies, structures, organizes, and finally provides a resolution of its findings.

Lastly, language processing or also known as natural language processing (NLP). This is the availability of AI programs to comprehend and interpret spoken and written human language with a high sense of reality. This helps develop interaction with other language users as well as understanding any other form of human communication.

2.3. Types of AI

In what concerns to artificial intelligence, AI itself is divided into capabilities and functionalities. The types of existing AI are divided into three capability-based and four functionality-based layers, seven in total. By what capabilities refers to, AI can be classified into: narrow-AI (ANI), general-AI (AGI) and super-AI (ASI)¹. Narrow-AI is the most basic form, and sometimes referred as “weak” AI. Then there is general-AI, also known as “strong” AI, and finally super-AI, essentially the most advanced stage of this technology and the maximum level of complexity and sophistication to which AI has been developed.

What differentiates these three tiers of AI is that each tier has its own level of complexity and precision. Narrow-AI (ANI) is predefined as the type of AI that can outperform a human in a certain and structured task. This could be anything from face recognition to internet search, quite similarly to an apparatus such as Siri or Alexa. This ability of AI, which is seen as the first stage, is characterized as machine learning, which means that the system learns and acts due to a set of predetermined rules.

Then comes general-AI (AGI). Although it may also seem as a basic phase of AI, it is characterized for being the latest used and strongest form of AI. This sort of AI differentiates by being a technological system able to apply its own knowledge and skills into different contexts. An example of this phase of AI is existent chatbots and autonomous vehicles. These technological devices run on what is known as “machine intelligence”, where the system itself

¹ BuiltIn: <https://builtin.com/artificial-intelligence/types-of-artificial-intelligence>

is able to apply most of its own criteria in different situations. This more advanced stage of AI is currently technology's apex.

The most intelligent and sophisticated form of artificial intelligence is super-AI (ASI). The capability of this type of AI is described as being technology systems that outsmarts the intellectual abilities and powers of regular human intelligence. Learning from collecting information, reasoning and self-correcting themselves, has led ASI to be the finest form of AI.

The principal and most distinguishable feature to categorize AI from other phases is its machine learning processes and human intelligence. ASI assembles these features so incredibly to the point that it can adopt machine consciousness. This final stage of AI has not been reached yet, although arguments of virtual assistants and expert systems, like ChatGPT, are closely alike.

The four other types, described as functionality-based AI, deal with how AI applies its potential to carry out any sort of tasks. The four functionality types that AI can be classified are: reactive machines, limited memory, theory of mind and self-awareness¹.

Reactive machines are seen as the simplest form of AI. These are computed machines that are based on programmed rules and instructions. This type of technology is characterized for being unable to auto-learn, store memory and give predictive analysis. Being AI's simplest system, they are commonly used in our day-to-day world. Things such as our email "Spam Box" and Netflix movie recommendation algorithm belong to this domain of AI.

Limited memory AI, on the other hand, are advanced and skillful AI systems able that store data and make predictions based on information gathered. Many AI applications that we know off come from this typology of AI, for instance chatbots and Sophia.

Theory of mind, a more advanced form of AI, stands out for having capability of understanding human being behavior. This is an AI application that can determine certain attitudes and perceive emotions, in human and AI systems. It can read and interpret these emotions, and predict future actions based on that information. This sort of AI advancement is seen as dangerous and premature for some experts. An example of this are autonomous cars which

¹ BuiltIn: <https://builtin.com/artificial-intelligence/types-of-artificial-intelligence>

need to be able to infer certain mental states of humans and pedestrians to predict their behavior.

The last type of functionality is self-aware AI. This AI is beyond that of theory of mind, as it is capable of developing self-awareness, making these technologies able to identify their own existence and identity. Researchers and professionals believe that once this AI is active and functioning, it will not be able for humans to control it. A system able to understand intentions, beliefs, desires and fully think and act for itself is something that drives specialists to really question its impact. For now, no one knows for sure the outcome that this AI might have in our world.

2.4. Limitations and problems

There are many problems and limitations related to artificial intelligence that must be addressed. AI is having an immense eruption in our world. And while there are praises towards the positive change that these AI machines might bring, in the sense of innovation and productivity, there are also numerous problems linked to these AI systems.

Data and work performance bias is one of the biggest problems when addressing AI. Lack of understanding the context of situations in which AI systems are arranged to work sometimes makes their functioning unreliable and biased. These machines are trained to cope with complex algorithmic rules, and manage large amounts of data that can sometimes cause them to struggle with directions and produce erroneous outcomes of work. In unpredictable working situations, bias in the decision process in AI tends to appear. This is seen in war drones and automated vehicles with the universal example of AI thought process in life or death situations; “Do I crash myself and save the lady or do I save the driver but run over the lady?”

Further to this, lack of common sense, creativity and emotion are three important features that artificial intelligence has struggled to accomplish. As senior researcher at Acrisure Technology, Rafael Tena says, “machines may work better than us 90 percent of the time, but that last ten percent, what you would describe as common sense, is really hard to get to”¹. Although AI systems are seen as flawless in their response, they still lack common sense, leaving rationally

¹ BuiltIn: <https://builtin.com/artificial-intelligence/types-of-artificial-intelligence>

and common sense as an attribute exclusive only to humans who are able to morally discern right from wrong.

In what creativity concerns, we have seen new profound practices of creativity, standing out OpenAI's art generator Dall-E2. Although, this degree of creativity has limits, as there are no AI machines that can feel or think for themselves, leaving infinite creativity for humans. Emotions and feelings are senses that are not recognized in AI technologies, making them incapacitated of full human intelligence and reason. AI tools can process data, stand out trends and patterns, and even recognize states of emotion through facial and voice expressions, but are still incapable of expressing those natures themselves.

AI systems manufacturing and creation process is something that still poses a limitation and a problem to the economy. AI systems run under complex and costly semiconductors. These semiconductors are made up of precious and costly metals, like germanium and gallium arsenide¹, that make this product expensive and distinguish it as a scarce commodity. The problem with the manufacturing of semiconductors is that 60% of the world's total production of semiconductors and 90% of the more advanced ones are made in Taiwan by a multinational semiconductor producer called Taiwan Semiconductor Manufacturing Company (TSMC)². Nowadays, there is a huge demand and little supply for semiconductors, creating shortages and tending to drive prices up due to customer competition to buy this device. Right now, countries like the US and China that need these semiconductors to run many of their computer processes and activities are dependent on this one company. As there is a current deficit of semiconductor production, especially in times of crisis like Covid-19, this has led companies like Nvidia Corp. and Intel Corp. to create their own headquarters and logistics for production. With this, corporations aim to cut down costs and be less dependent on market demand fluctuations.

Another problem to solve in the near future regarding AI implementation is safety concerns. Some argue that freedom and stability is at stake due to AI. For the moment, humans are still not sure to what extent it could cause potential harm to our world and to humanity. AI governance is needed desperately. Regulations to make use of AI systems ethically and beneficially need to be set forth. Cybersecurity, economic and global security are an issue

¹ *IEEE*: <https://irds.ieee.org/topics/semiconductor-materials#:~:text=What%20are%20the%20most%20used,the%20earliest%20semiconductor%20materials%20used.>

² *The Economist*: <https://www.economist.com/special-report/2023/03/06/taiwans-dominance-of-the-chip-industry-makes-it-more-important>

involving new AI technologies. People and countries are beginning to massively implement these systems in many organizations and businesses, and there is no official control for the correct implementation of responsible AI that does not pose a threat to society. This dilemma will cause huge social problems in years to come.

3. Application of AI on company's workforce

3.1. AI as a labor source and the Luddite views

The implementation of artificial intelligence in the financial field has brought many advancements for the whole of the economic system, revitalizing the historical movement of Luddism. Luddism was a movement that was initiated in England in the 19th century, where workers were starting to protest against the excessive adoption and use of new machines that put their jobs and livelihoods at risk¹. In today's world, as AI is completely revolutionizing the financial industry, the big question arises regarding the potential of these technologies to displace jobs and negatively impact human workers.

The first “Luddites” protested against the mechanization of their industries, as they believed that adopting these new technologies would not only be harmful for their jobs but also for the production and performance of their factories. Luddites started revolting against factories that were automating production processes, but eventually with the control of authorities this movement ended up winding down. The term “Luddite” nowadays refers to those that resist the advancements of technology, and this is for sure an argument that we are going to see come up much more often with AI's recent explosion.

AI has recently been proven to be a massive disruptor to any type of industry, and one of the sectors most affected by it, is the financial sector, due to the contributions of these technologies to massively increase productivity and efficacy. One of the most distinguishable characteristics of AI is its data analytics. Algorithms can now process financial data, trends from markets, articles and social media news in a matter of seconds, facilitating professional workers jobs and removing the need for external human aid to be apt to carry out these tasks. A great example of this have been the chatbots and virtual AI-assistants that have recently been put out to public use. These devices are already revolutionizing work means and customer service in the financial industry. Complex AI systems are now able to handle any sort of inquiries, assist with any sort of transaction and activity, and even have the ability of giving personal expert recommendations on things asked.

¹ The MIT Press Reader: <https://thereader.mitpress.mit.edu/the-future-encyclopedia-of-luddism/>

However, during these past months, with the massive outbreak of AI, concerns of possible job substitution have started to arise. There is a global fear that these technologies become the natural replacement for human workers, inevitably creating huge unemployment and inequality. This concern goes all the way back to Luddite points of discussion, where workers were trying to resist automation and fight for their rights and for their jobs.

As previously seen in the 19th century, with machines that at first were believed to be unfavorable for the whole of the economy, these same machines ended up pushing the world into an industrial revolution, creating prosperous nations and new economies of scale. Today, that same potential of innovation and advancement lies in AI and its capability to automate human related tasks that will undoubtedly create new opportunities for workers. New fundamental roles such as data scientists, AI engineers, AI strategy consultants are predestined to appear. One perspective to this is that AI is going to build up on previous human capabilities and consequently free workers from dull and time-consuming activities, allowing them to focus on high value tasks that need creativity, critical thinking and human skills. Implementing AI at scale can bolster a company's culture and improve team effectiveness (Boston Consulting Group (BCG), 2023).

As previously done in the industrial revolution, probably the most essential factor to positively indulge the impact of AI in our workstations is to invest in creating training and upskilling programs for employees inside businesses; that is teaching and equipping our workers with the latest skills to successfully adapt to changes in the economic environment. This is ultimately done, so that workers can transition sustainably into new roles, complementing and making AI technologies be reliant on them. This is the most positive and sustainable way of implementing these technologies into our industries. Governmental and educational institutions, as well as private sector businesses are the key in providing the learning and reskilling opportunities for workers to adapt to this new and challenging AI-driven economy.

Furthermore, the ethical considerations when integrating these systems are immensely important. AI's responsible application in the financial sector is vital to have a rigid control over things such as accountability, transparency, biased decision making, sustainable and harmless deployment of AI systems into the workplace, and evasion of any sort of uncontrollable AI expansion. All these things are capital to prevent unethical practices in companies and to cooperate and work in the interest of the whole of the society.

3.2. Impact on businesses and on its workers

The massive implementation of artificial intelligence in the 21st century has had an impact in companies across numerous industries. The game changing powers that AI has brought into our world have created the need for business to adapt to the change and invest large amounts of money to implement these technological systems into their processes. This massive transformation of modern economy functionality is not only going to be seen in business strategies and operational proceedings, but especially in company workforce dynamics.

Companies in these times are compelled to shift and adapt to the changes put forth by AI, having the necessity to implement these mechanisms to remain competitive in the future. Companies must consider reevaluating their business models and apply the vast opportunities that AI integration is bringing to their businesses. If companies are able to coordinate their goals and strategies with this new technological landscape, this will position them with the ideal recipe for success. These changes will often cause a huge shock for the company and force firms to embrace new cultures and values. The most important aspect of these changes is transmitting these new norms and values to the workforce. They are going to be the most compromised and influenced by this transition. Having strong corporate willingness to cooperate with the change, as well as applying sustainable approaches to implement AI and using clear methodologies to coexist together with human workers, will be the differentiators of value creating businesses from decaying ones.

AI implementation is also going to impact companies' financials. The costs relate to the installation of sophisticated software and hardware, the acquisition of AI apparatus, the infrastructure needed to develop efficient operations, and the training and skilling of employees are all significant costs for businesses. Companies must make purchase plans to incorporate the sufficient and necessary devices for the business to work efficiently without over investing. Additionally, as these technologies keep advancing, continuous innovation and investment must be necessary for companies to essentially keep up with trends and competitors. Companies that underinvest in people and processes, will quickly lose momentum with artificial intelligence (BCG, 2023). Some companies are already experiencing the strategic and competitive advantage that AI is proportioning their business. Highlighting how the innovation produced by AI systems eventually outweighs the costs.

AI systems carry many associated risks, especially the ones related to workflows. In companies, the production chain can sometimes be massive, and changes inside this chain can have an impact on the overall workflow. Most applications of AI are seen and used to improve a specific task, but what smart companies are starting to analyze is the possibility to introduce creative systems into their workflow as a rationale for a new look at end-to-end processes (Davenport, Holweg, Jeavons, Harvard Business Review (HBR), 2023). Artificial intelligence is going to bring new capabilities to a business's operations. Companies are beginning to structure and plan the demanding tasks needed, in what frequency, and what sort of worker, human or AI, is predestined to perform that task. When AI is accompanied by partial automation, companies also need to decide what humans will do and what machines will do in their processes (Davenport, Holweg, Jeavons, HBR, 2023).

Inside the workflow are the company's pyramid of workers. The disruption of AI is going to affect the existing job positions and force workers to reskill and upskill, or inevitably lose their jobs due to AI replacement. Implementation and automation of specific jobs inside companies are going to force these corporations to address the possible outcomes of the impact of AI technologies on their workforce. Companies will sadly be forced to layoffs due to these technologies. Thus, businesses and organizations will have to focus on minimizing the worker damage caused by AI and seek to invest in training programs for their workforce and in recruiting qualified employees.

3.3. Sectoral view of AI's impact on workforce

3.3.1. ONTSI and ISDI institutional point of view

The transformations that AI's is bringing about to the financial industry are going to shape the industry's future. Its applications cover all domains inside of a company, and as of today practically every job position inside a company is at risk of competing with an AI machine.

The versatility that AI can take have caused the rapid success of this technological application. Introduction of chatbots that can provide personal support and provide improvement guidelines to the company itself has been a major development. Moreover, the fact that these devices can perform from the most basic to the most complex activities in a 24/7 period, with maximum

speed of response, pose a big threat for regular workers. Advanced algorithms are also something that have been perfected over the years. Nowadays, these sophisticated AI algorithms are starting to be able to predict trends, assess creditworthiness and analyze any sort of data. Specific jobs such as anti-money laundering (AML) and know your customer (KYC) activities are beginning to be common AI tasks inside businesses, posing a risk to workers.

With the potential, and now real threat of this technology, I have approached some of the best AI topic-related connoisseurs in the governmental and financial world to get a true perspective of what is really going on with AI in the workstations. The ONTSI, National Observatory of Technology and Society, was the first institution approached, interviewing two research technicians: Jose Antonio León and Jose María Zavala. ONTSI is a Spanish public service company belonging to the parent company “red.es”. This institution is in charge of studying the technological developments and the different impacts that technologies are having in different social sectors such as economy, employment, security and rights, among many others¹. This organization identifies knowledge and observations of certain studied topics and provides the public with the studies and indicators of the detailed analysis they performed.

This institution emphasized how AI is building a competitive advantage for businesses, highlighting that the companies that take advantage of this technology will be in a superior position to those who do not (León, 2023). Clearly, the world is doomed to incorporate and adapt these developments. Fighting to use only traditional means of working will make these businesses uncompetitive and unfit to thrive in their respective markets. Businesses have to adapt to this transformation, as well as workers and jobs themselves (León, 2023).

Corporate productivity was also something discussed with the ONTSI. Thanks to AI, there is a present and real possibility of providing services more cheaply (León, 2023). The effect of this will have direct consequences to society and to the different income level groups. What may have been a major cost for a business on a final product or service, solely affordable to a smaller percent of society, thanks to AI adaptations, businesses are going to be able to provide these products and services cheaper while covering a larger group of clients (León, 2023). IA as a compatible alternative to workers is not only going to bring a quantitative leap, but also a qualitative surge as means of production and revenue growth for companies.

¹ ONTSI: <https://www.ontsi.es/es/Que-hacemos>

Job decentralization is another relevant topic related to the human labor force and its conflict with AI. Decentralization consists in the division of tasks in order to separate and divide these in certain levels of management. Mr. Zavala first explained that in the last century decentralization was focused on workforce levels. Then we saw another wave of job decentralization based on and prioritizing customer service. Today, the new and present wave of decentralization in the world is technology, and more precisely AI (Zavala, 2023). Artificial intelligence has revitalized this process much more than in the past. This is a problem for companies and especially for workers, as they are the main victims of this modern decentralization and digital transformation. The alternative given by the ONTSI to respond to the disruptive effects of AI in our workforce is to impose a “universal basic income” (Zavala, 2023). According to the ONTSI, this would allow workers whose jobs are being occupied by AI or at risk of being displaced to have financial coverage. This universal basic income would give workers the right to work and a wage, which would help maintain the labor market competitive and ultimately contribute towards a prosperous and healthy economy.

On the other hand, employees are going to experiment a positive change with the implementation of AI in their businesses. By things such as improving processes, optimizing time, and freeing workload from workers, ultimately giving them more time for other tasks (Zavala, 2023), or even having more flexible schedules. At first, AI seems like it is going to harm workers, but on the upside, these technological mechanisms are going to be able to improve workplace stations and means of work for workers. Moreover, also easing their total working hours periods. Today, working hours regulations is a hot topic of discussion and in many countries a problem, due to the fact that some workers are subjected to inhumane working hours. AI could be the tool to help solve these problems which nations and governments are trying to eradicate but are still happening.

In terms of direct damage towards the human workforce, ONTSI defended that we are still at a very premature stage and it would be too risky to dictate which sectors are condemned to be controlled by artificial intelligence. Most automatable and routine occupations are the most susceptible to being replaced by technology. The more creative and ingenious jobs are, at first, the most protected from the danger of being substituted (León, 2023). It is clear that jobs with little change in task routine and sometimes minimal human interference are the most susceptible to being displaced. And this is because the level of difficulty of adaptation of a robot to these types of tasks is extremely low. Creative tasks, such as a marketing manager,

where the person needs to study the present context of the economy, the product, their competitors, the company's values and mission and have a distinctive intellectual creativity, is far from the reach of any AI system. These types of jobs that need human skill are not in danger of substitution.

The digital and robotic transformation is going to bring changes in workforce strategy in companies. The ONTSI highlighted that the most vulnerable to these changes were those employees lacking advanced studies and especially those with physical occupations. The institution showed us a study that depicted how workers with a poor academic background were the most susceptible to being replaced by AI. Digital alphabetization is going to be an absolute necessity to participate in the current and future labor market (León, 2023). This, also known as digital literacy, is the ability to use IT and digital technology to find, evaluate, create and communicate information¹. Students and upcoming workers have the obligation to learn about these technologies. We are arriving at a point in history where humans and machines are going to coexist in many social environments and one of them is undoubtedly the workplace. The necessity of being qualified and prepared, knowing and understanding how IA works, is going to be something crucial for human employee sustainability and survival.

After talking to the ONTSI, I proceeded to interview the International School of Digital Innovation, ISDI, a leading institution in education and digital transformation. Unlike our previous interview, ISDI is a private institution that focuses on educating digital professionals, promoting digital talent through courses, degrees and masters, and spreading knowledge and supporting entrepreneurs and companies to provide these professionals with skills and knowledge on digitalization. Being a private institution, it has many connections with corporate companies inside and outside of Spain. Founded in 2009 by Javier Zapatero, the ex-director of Google EMEA, and three other partners, ISDI forms some of the finest and well-prepared alumni in four institutes around the world including Spain, USA, France and Mexico. At ISDI, I was able to interview Nera González, an associate professor of artificial intelligence and big data. Mrs. González is someone with previous work experience and knowledge in the field of digital innovation and disruptive technologies such as AI.

¹ UNESCO: <https://unevoc.unesco.org/home/TVETipedia+Glossary/show=term/term=Digital+literacy>

Our interviewee was both worried and optimistic on the revolutionizing power that these technologies will present to our society and to our workforce. ISDI currently imparts courses, degrees and masters in computer engineering and AI, done to prepare students for the future job market and to enable them to cope with the new technological era (González, 2023). Providing the new generations with knowledge on AI and computer science is essential for them to understand and interrelate themselves in the workplace with these technologies. ISDI is foreseeing that education will change radically, highlighting that the integration of AI in our lives will soon become something common (González, 2023). In their researches and studies, the institution emphasizes on the aspects of AI machine behavior and on the understanding of their “neuronal network”. The aim with these studies is to educate students and help them understand how these machines can simulate human behavior (González, 2023), while at the same time provide them with the indicated guidelines on how workers will interact with AI in the future.

As also mentioned in my interview with the ONTSI, AI in companies is expected to increase optimization of non-critical tasks. For instance, AI will be the perfect tool to reduce workers’ back office tasks. By implementing AI in these sorts of operations, companies can free workers to then focalize them in strategic and higher-value functions (González, 2023). Although at first this is seen as job displacement for workers, in the long run, it can have beneficial effects for both workers and for the company. AI and automation increase overall operational efficiency for workers by reducing the amount of time they spend in repetitive tasks. The procedures that are being automated help manage costs effectively and save time for workers, as well as allowing them to focus in higher value-added activities. In spite of applying these new routines, workers still need reskilling and upskilling programs to adapt to their new roles and responsibilities. This also creates costs, but substantially small if compared to the resulting outcome of these practices.

Preparing the workforce with the correct set of skills is going to be the differentiator factor to adapt AI into our businesses. Employees are not only going to need a set of hard skills such as knowledge, in the form of studies, and previous work experience, but most important of all a good array of soft skills. Soft skills are the interpersonal traits and skills that distinguish each individual in performing in their own unique and value-creating way, and that directly compliment a person's hard skills. The World Economic Forum points out how companies are doing surveys amongst their employees, standing out their interest in human workers so-called

individual soft skills. Until now, soft skills have not been developed in AI-related technologies. AI lacks these distinctive soft skills as AI machines follow a series of predetermined rules and work in acquaintance to those established norms. These essential working qualities are something unachievable for AI systems and exclusive only in humans. Value-adding capabilities like soft skills are the competitive edge that human workers will have over AI machinery and what companies are going to pay for in the future.

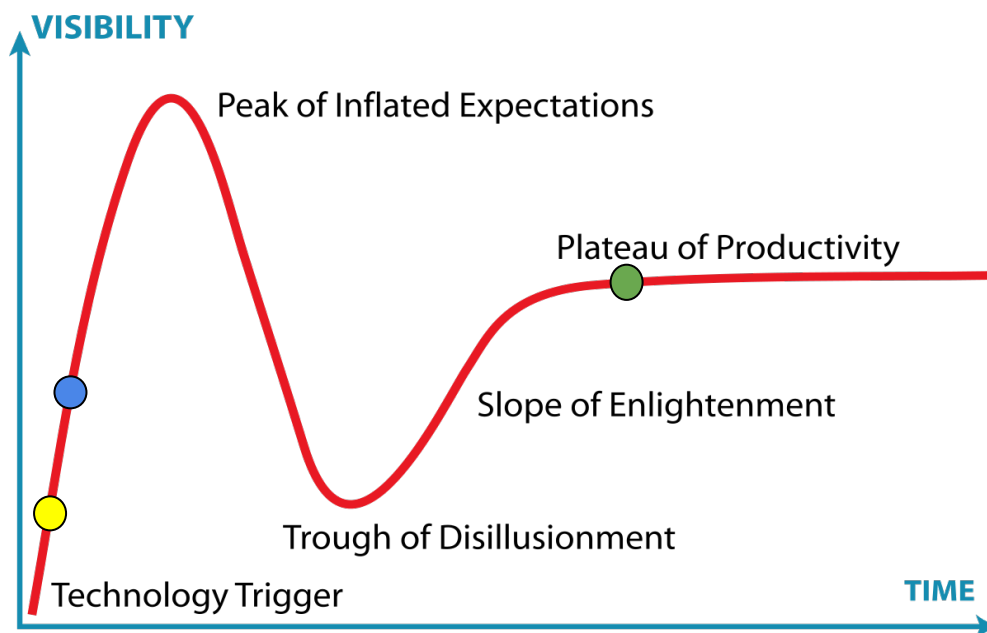
Something that Mrs. González strongly emphasized, was introducing “responsible AI” into the workplace. This is an AI integration approach, that even educational institutions are trying to teach, on the end uses of AI in companies. With a principal aim of benefiting both individuals and companies in terms of efficiency and productivity, and at the same time, address issues such as worker rights and interests (González, 2023). This term, “responsible AI”, teaches workers and companies of AI’s appliance as a tool to support and optimize operations, instead of as the mechanism to change the economy and the labor force. Responsible AI is extremely important for business. Studies are starting to show AI measures being applied as Corporate Social Responsibility (CSR) policies¹ in companies to protect workers against AI’s discriminatory and abusive use.

The impact that AI is currently having in society can be measured with Gartner’s curve, also known as the “hype cycle” (González, 2023). The Gartner Cycle gives people a view on how technology will evolve over time, providing business with a source of insight on the management and deployment of this technology in the context of time and expectations. Gartner's “hype cycle” has been used by governments, business and different institutions to foresight where a particular technology lies in the present and its future course of action. Nera González defended that AI is in a very premature stage, in which fear and unrealistic expectations are generated. As seen throughout history, advances in technology, like the example of Excel, were firstly seen as a threat to ordinary job positions, such as accountants, but we later observed how this technical tool (Excel) was an advancement and a way to facilitate work for the entire labor pool. Below we can see Gartner's curve and three plotted points indicating the situation in which technological advancements, such as AI (blue), the Metaverse (yellow), and Excel (green) currently find themselves². By looking at the graph we can deduce that both AI and the Metaverse have not reached their maximum peak of

¹ European Comission: <https://futurium.ec.europa.eu/en/european-ai-alliance/blog/ethical-ai-performance-component-csr-and-esg>

² Gartner: <https://www.gartner.es/es/articulos/novedades-del-hype-cycle-de-gartner-para-las-tecnologias-emergentes-2022>

expectations and still have several phases ahead to get to what we think is going to be a “phase of normalization and productivity”.



Source: Wikipedia, https://en.wikipedia.org/wiki/Gartner_hype_cycle

3.3.2. Impact on security solutions workforce: Prosegur

AI is having a tremendous impact in security companies' operations and is completely transforming their workforce. Through the use of these technologies, security related businesses are innovating their surveillance systems, starting to handle large volumes of data for threat detection, and automating monotonous tasks. The introduction of AI in this industry is shifting job roles and is beginning to be a corporate problem for security companies. In the near future, a balance between human workforce and AI is going to be necessary to ensure a role for human workers inside the company's operations and to responsibly integrate AI capabilities in the security industry. For this, we interviewed a well-known Spanish listed security company, who is currently encountering this new wave of AI introduction in their business.

On this first business related study, we met with Prosegur. The company is a global security firm that provides a broad spectrum of services and solutions in the security field. Founded in 1976, the company has presence in six continents around the globe and offers services such as

man guarding, cash management, cybersecurity and alarms¹. The business serves multiple sectors including retail, logistics, banking and government institutions. Prosegur has been one of the most concerned and some of the first companies in Spain to take the initiative of digital transformation inside their business.

This company, much aware of the technological situation, is strategically positioning themselves in the cutting-edge of this digital shift. Leading the company to win the award for “Sustainable Innovation” in Spain’s “Computing Awards 2023”². Seeing digitalization as a pillar to maintain competitiveness in the future, the company is constantly integrating AI solutions into their business and even started deploying security robots, like Yellow³, in their labor pool. We had the opportunity to meet two professionals and experts on the field of AI at Prosegur: Manuel Tarrasa, the Chief Technology Officer (CTO), and Fernando Cisneros, the corporate Director of Digitalization, Automation, and Robotics of the company.

The labor market is going to be affected by the implementation of AI. As Mr. Tarrasa told me, there are three different layers of the labor market and out of these “layers”, there are some that are going to be more stunned than others. For the time being, the middle layer, consisting of lawyers, accountants and related jobs, will experience the most significant impact as AI technologies are starting to be fully adaptable, and in many cases, a replacement possibility for these jobs. The lower layer, such as sweepers, taxi drivers, etc., have a lesser immediate impact than the middle layer. Finally, the upper layer, mainly consisting of high skilled workers, some of them being the very developers of these technologies, will be least affected (Tarrasa, 2023). This “labor layer impact” difference points out how we need to foster a workforce that can adapt, change and readjust to the demands of this AI-driven economy. With the rapid advancement of AI technologies, companies are starting to seek in the labor market qualified personnel capable of working alongside these technologies. But, this upheaval of artificial technologies has also presented the world with the scarcity of talent, the problem of not having enough individuals who understand and know about AI (Tarrasa, 2023). The world and future generations have handicapped themselves in this race for transformation as there are incredible untapped opportunities for innovation at the intersection of industry and academia⁴.

¹ Prosegur: <https://www.prosegur.com/lineas-negocio>

² Computing: <https://www.computing.es/mundo-digital/noticias/1150086046601/computing-celebra-premios-2023.1.html>

³ Prosegur: <https://www.prosegur.es/media/articulo/prensa/yellow-perro-robot-prosegur-salta-nuevamente-a-mutua-madrid-open>

⁴ Forbes: <https://www.forbes.com/sites/judithspitz/2022/03/30/the-scarcity-of-ai-talent-a-problem-of-our-own-making-is-a-problem-we-can-solve/>

Throughout our history there have been all kinds of labor shortages; from farmers, to salesforce, and now in this decade of the 21st century there is a great shortage of digital and technological workers. Schools, universities, businesses and countries have to implement measures to change this global labor shortage.

Incorporating high-end technological systems into their business is something that Prosegur has prioritized in these last decades. The company is steadily implementing AI solutions into security roles such as video surveillance, data collection and prevention of cyber-attacks (Cisneros, 2023). At the moment, most of these AI applications are compatible with humans and are serving as useful assistance to current workers. Prosegur believes that these technologies de-leverage employee functions (Cisneros, 2023). What we mean by this is that AI is not stealing workers' time and workload, but rather improving workers' means of working and contributing to make their work more flexible and coherent. To add to this, technologies like AI are not only helping regular workers complete their daily tasks with a notable degree of improvement, but are also indirectly contributing to the business in the sense of offering new products and services. This can be seen in the case of computer code language recognition. Before, these tasks needed an external sector-specialized company, which added associated costs to Prosegur. According to Prosegur, AI is seen as the big thief of jobs in this 21st century, but in contrast to this, their experience is that AI is generating new job opportunities and allowing companies to create innovative products and services that before were unimaginable.

In the evolving landscape of technological advancements, it is predicted by many companies that jobs will be displaced and even lost to newly AI competences. Some are saying that the effects of AI for a company's workforce are going to be devastating. Others argue that the outcomes will not be disastrous at all. To this matter, Prosegur projects that around 60-70% of jobs inside the company will undergo displacement due to AI applications (Cisneros, 2023). However, the essential thing to understand here is that this "displacement" does not mean job loss but rather a shift in roles and responsibilities for employees. An excellent illustration of this problem can be seen in the company's possibility of using autonomous vehicles for cash transport. While this may assume that workers involved in the transportation of valuables may be no longer useful, it is absolutely untrue. Regardless of incorporating autonomous vehicles for the transportation of cash, the occupation of human personnel is necessary to supervise the cash, the vehicles, and manage the handling of money. From this, we can resolve how the role

of a transporter of valuables undergoes a sustainable displacement. Once again, showing how the requirement for workers and human skill is compatible and vital with AI interaction.

Prosegur is aware of the crucial role of technology and innovation inside the business. Highlighting that these two elements are the “fundamental lever” (Cisneros, 2023) for any company. Hyper-automatization of processes and of people is something tightly related to organizational functionality and growth (Cisneros, 2023). The term hyper-automatization refers to the consolidation of multiple automation technologies. In the case of AI, this is used to further develop the reach of automation and improve existing processes. At first, this seems as something destructive for the human workforce, but in the long run, Cisneros points out that the generation of human jobs is going to increase thanks to developments like AI. The core belief of Prosegur is that eventually, with time, AI will generate new jobs. The effect that AI is having in businesses workforce, as analyzed with this security company, is a mutual repercussion. This is explained by the fact that the greater the implementation of AI in the workplace, the greater the capacity for technology augmentation and workforce expertise there is going to be (Tarrasa, 2023). The more technology embedded within a company, the more technically skilled number of employees a company needs in order to keep its operations running smoothly.

Although companies are incorporating these systems in their workflow, they are interested in maintaining human work power in their businesses. Mr. Tarrasa explained that Prosegur is preparing their employees to be resilient to the change that AI brings to the workplace (Tarrasa, 2023). Companies are condemned to apply these successful AI practices and adapt their teams to the digital era. It is important for workers to have a positive mindset and not be conditioned by the competition with AI technologies. Both workers and companies must push themselves to be receptive to these changes and try to accustom themselves to this transition in the most proficient and positive minded way. In this sense, companies are already taking preventive measures and investing in their personnel. Prosegur, for instance, is setting to focus 25% of its investment in “people” (Cisneros, 2023); physical employees, departments, salaries, and recruiting. Moreover, the company is putting forth new employment measures to enable employees with disabilities the possibility to join teams, inside the business, and work besides these technologies (Cisneros, 2023). Seeking opportunities in changing times, is the “motto” that Prosegur is transmitting to their workforce. Instead of giving in against this technological

breach, Prosegur aids and motivates its workforce to perform and be prepared for future changes.

3.3.3. Impact on information technology (IT) solutions: Indra

Artificial Intelligence is changing the way we work, affecting many sectors in our economy. The information technology (IT) industry is a division in which AI has had a major influence on. IT companies' workforce are impeded to acquire the necessary skills and knowledge to work with AI technologies. These businesses need to offer their clients with the highest-end consultancy, advisory and degree of technological solutions. IT companies are starting to revolve their operations around AI and transform their workforce to meet needs of the market. With collaboration and competent use of AI, IT companies are innovating their business models and adding cutting-edge technology backed up by a qualified human workforce able to deliver the best service possible.

For a second idea of the real impact of AI in companies' workforce I approached Spanish multinational company Indra. The company is a provider for information technology services in finance, insurance, public administration, airports, defense, healthcare, media, telecom, security, energy, and infrastructure end markets¹. The company was founded in 1992 and is listed in Spain's stock market index, the Ibex 35. Present in almost every continent around the world, they offer services such as analytics, cloud computing, enterprise resource planning, networks and communications, amongst others². To cover my interest in AI's influence on the company's workers, I met with Juan Francisco Gago, the Director of Digital Technologies and Operations at Minsait. Minsait, an Indra company, offers a wide portfolio of technological solutions to clients, specializing in digital transformation through the use of their own strategy and tools.

Productivity in operations has been something that Minsait has experienced with the introduction of AI. The integration of these systems in the workflow processes have speeded up overall functionality of the business and diluted bottlenecks in certain activities inside the company. Jobs that before the integration of these technologies required three persons and a week to complete, with the help of AI innovations, are now being performed by one person

¹ Indra: <https://www.indracompany.com/en/solutions-services>

² Indra: <https://www.indracompany.com/en/minsait>

and terminated in a couple of days, sometimes even hours (Gago, 2023). In this sense, Minsait has benefited from AI, as they are using these extra two workers and their remaining hours to complete new tasks and move forward with work. A major drawback of AI's intrusion in the workplace is the way in which job positions are going to be remunerated (Gago, 2023). In relative terms, AI is going to create cheaper services for clients and consequently devalue worker's remuneration. This is seen in Minsait's previously mentioned example where clients are now paying only one person and a machine to perform an activity, as opposed to before when there were three employees working on an assignment.

These sorts of changes in worker positions create a new cycle of operations. By implementing AI-related mechanisms into their businesses, companies like Minsait are creating a chain reaction among the business and its customers (Gago, 2023). Businesses like Minsait are going to start offering new product and services solutions with a consolidated workforce team of human and artificial intelligence apparatuses. Clients are going to see themselves forced to purchase these products and services, in comparison to businesses that do not have these technological solutions, as these are better and more price-adjusted offer of solutions, ultimately creating a chain reaction in the economy. In a sense, both the business and the client will be obliged and will pay for this advancement, especially in the case of the business in order to maintain the pace of the rest of its industry competitors (Gago, 2023).

Indra's concern for the growing popularity of AI as a new source of workforce was constantly addressed by Mr. Gago. As in Prosegur, Minsait is concerned that the virulence with which AI has entered the "labor scene" will end up striking numerous activities and workers to become automated. If these types of jobs, threatened by AI replacement, do not transform, there will be a risk of losing those workers (Gago, 2023). The company even states that their computer technology consulting branch is developing platforms for user clients to develop their own AI programs and systems. Instead of having personnel reaching out to different businesses and implementing their products and services, the company offers these new services that are time and cost saving. Seeing what AI has achieved in recent years, if no measures are put into action there is a considerable risk that these machines will sweep most job positions inside companies in the short term of three to five years (Gago, 2023) and displace around 800 million jobs, which accounts for 30% of the global workforce, by 2030¹.

¹ BanklessTimes CEO, Jonathan Merry: <https://www.banklesstimes.com/news/2022/11/29/ai-could-displace-800-million-jobs-by-2030/>

AI's fast progression inside companies is creating side effects for workers. Its direct competition with existing workforce will start massive waves of layoffs. These labor adjustments have already been implemented by companies, considering the last global pandemic and the recent context of geopolitical tensions. It is tremendously important for companies and workers to mutually agree on regulations to achieve mutual understanding and adaptability to the changes (Gago, 2023). Government institutions' role in this new workforce crisis is capital for companies to adopt and apply sustainable measures to their workers. Previously we saw Mr. Zavala supporting the idea of a universal basic income to protect workers against these disruptive AI systems. So far, the European parliament has pronounced themselves stating that external control towards AI is likely to remain limited, and delegates companies to crucially ensure self-assessment before adopting these technologies¹.

The development of AI in IT companies such as Minsait is a consequence of cyclical ups and downs created by technological disruptions. These shifts in the speculative power of the change of AI in the workforce often generate inflated and erroneous expectations. Although at first seems contradictory, AI technologies will reshape and positively impact the labor market. Technological advancements often cause job loss and displacement concerns, but in contrast these progressions tend to stretch the labor demand (Gago, 2023). New jobs and industries appear with the complementation of AI in our economy, providing opportunities for those able to reshape to the changes. The common term nowadays with AI is "adapt or perish" (Gago, 2023). The fundamental aspect of these transformations in companies is recognizing the cyclical nature of technological advancements and understanding the potential it has in labor demand expansion.

¹ European Parliament, pag. 54: [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729516/EPRS_STU\(2022\)729516_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729516/EPRS_STU(2022)729516_EN.pdf)

4. Consequences of AI for the workforce

4.1. Risks

We have now understood that the transformative power of AI is undeniable. Although it has multiple benefits for the workforce, it also has profound implications for the labor market and the workers. AI's impact on workers is a complex issue; the severe threats that AI poses to workers, such as job loss and displacement, discriminatory and ethical considerations and widening inequalities portray the negative consequences that AI is bringing forth to human workers. As we find ourselves in this AI-driven future, it is crucial to address the challenges created by these technologies in order to protect the virtue and values of our workers.

Job loss and displacements due to AI and automation is a major threat for the global workforce. Companies like Goldman Sachs are predicting that the total number of jobs lost or degraded by AI are going to be around 300 million (Hatzius, Briggs, Kodnani, Pierdomenico, Goldman Sachs, 2023). Other companies, such as McKinsey, estimate a worse outcome for workers, indicating that in 2030, up to 800 million workers could lose their jobs to automation (Manyika, Chui, Woetzel, Sanghvi, Mckinsey, 2023). This extensive displacement is not only a concern for workers, but a global human crisis. AI is not something that solely companies are implementing. Nations and member communities, like the EU, are promoting digital goals for their "Agenda 2030" highlighting that uses of AI and big data by 75% of EU companies must be achieved to keep in line with the "Agenda 2030" plans of digital transformation of companies (European Commission, 2030).

Jobs with repetitive tasks are the most vulnerable to AI, but the threat transcends across every sector. Statistical researchers are showing how two-thirds of current workers are exposed to some degree of AI (Hatzius, Briggs, Kodnani, Pierdomenico, Goldman Sachs, 2023). The fear in workers is that the displacement of their jobs will make it difficult to find a comparable employment. This will cause mass joblessness and will raise unemployment. The risk with AI is that it will create cyclical unemployment, but also structural unemployment as the skills currently demanded by employers are easily fetched by AI systems and, in some cases, unreachable in human workers.

Over-reliance on AI tools threatens the capabilities of workers and creates a sense of isolation among workers. Changes in activities due to technology replacing either simple or complex tasks also raises deskilling concerns (Bankins and Formosa, 2023). In many industries, over-dependence on AI technologies can lead employees to deskill. Workers start to gradually interact less in their job positions and their skills and expertise start disappearing. The lack of worker engagement due to technological dependence in the workstations starts producing a sense of uselessness and isolation in workers. Overtime, this compromises professional development and job satisfaction.

There is a compelling concern about how AI is perpetuating and worsening discrimination and inequality in the workplace. The need of companies to implement these technologies into their workforce is “creating” discriminatory problems for workers. Recent corporate importance for diversity and equality in business is now being questioned by the disruption of AI. Massachusetts Institute of Technology (MIT) economist, Daron Acemoglu, says that replacing workers with technology “explains 50 to 70%” of the increase in inequality from 1980 to about 2016 (Acemoglu, 2020). Companies are constantly expressing their priority of developing a diverse workforce with equal opportunities for any person. However, with studies of the invasive practices of AI for human workers, companies are massively implementing these technologies and jeopardizing the importance of diversity in the workplace. AI systems could marginalize certain human worker groups undermining the effort to promote diversity and inclusion in the workplace. Equality and diversity are a problem that both corporate institutions and workers have fought for many years. Today, with AI it appears that this concern is again at risk.

AI gives rise to various ethical considerations. One such concern is the widening income gap created by these technologies. AI has the potential to disproportionately benefit different groups of human workers, creating further discrimination. From performed studies, it was concluded that since 1980, automation has reduced the wages of men without a high school degree by 8.8% and women without a high school degree by 2.3%, adjusted for inflation (Dizikes, MIT, 2023). This widening of the income gap is a major problem to our society. Degraded wages and creating income gaps will start producing uninterested and incompetent workers, unable to stand up to the AI-driven economy. Workers are in an unfavorable situation where they are doomed to accept these salary reductions. Moreover, incomes for people with college and postgraduate degrees have risen substantially during that period (Dizikes, MIT,

2023). This income gap between workers will generate loss of human connection in companies. Some workers, as opposed to others, will have better accessibility to work opportunities, creating a moral and ethical dilemma and consequently a global working-class struggle.

4.2. Opportunities

The introduction of artificial intelligence into the workforce is a mixed blessing. While it presents important challenges for human workers, there are also immense opportunities that can be adapted into workstations and that could revolutionize the workplace and the work experience of our employees. Efficiency and flexibility, health and safety improvements, and the potential for skill development and career advancement are advantages that AI systems are going to bring to our workers.

AI can augment efficiency of workers by transforming the way tasks are performed. Studies show that AI causes a 14% boost in issues resolved per hour (McKendrick, 2023). Having this substantial increase in productivity makes AI not only improve company results, but also centralizes workers to perform in demanding tasks. By taking over repetitive and routine tasks, AI can free employees' time for them to focus on tasks that require human wit. Such tasks include strategic thinking and problem solving, which are unreachable burdens for AI that need human creativity and ingenuity. Moreover, AI can simplify workflows, turning complex tasks for workers into simpler ones through data analysis and automation.

The surge of AI also creates more flexible working schedules. With the use of AI tools, certain tasks can be handled on a 24/7 basis, giving employees more control and adaptability for when and where they work. Also, helping employees be further involved in other operations of the company and having multiple tasks. Occupations with a larger share of routine cognitive activities reveal a significantly higher probability of increasing flexibility demands, specifically with regard to the employees' self-organization (Warning, Weber, Püffel, 2022). Flexibility can improve employees work-life balance and overall job satisfaction. Thanks to flexible changes in worker's schedules and occupations, employees are more energetic and motivated with their work, and less prone to burnouts.

AI has significant implications for workplace health and safety. AI is removing workers from situations that carry risk. According to the Bureau of Labor Statistics, in 2019, US companies

lost more than \$1 billion per week due to workplace injuries. Overexertion was the number one cause, relating to injuries from lifting, pushing, pulling, holding, etc. (Gianatti, 2020). In industries like mining, construction and manufacturing, AI and robots can assist in hazardous tasks, such as material handling and other fatiguing activities, and therefore reduce the risk of workforce injuries. Robots allow people to be removed from dangerous physical work and environments with chemical and ergonomic hazards, thus reducing occupational safety hazard risks for workers (EU-OSHA, 2018). Moreover, AI tools in the form of wearable sensors can monitor workers and alert them of dangerous conditions like heat stress or exposure to toxic substances.

On the mental health side, the adoption of AI systems can decrease occupational burnout and depression disorders. AI is reducing workload and stress levels of employees by automating these exhausting and time-consuming activities. Jobs like call centers have many psychosocial dangers due to overwork. AI chatbots can eliminate these basic and weary occupations and decrease employee nervous breakdowns. An AI system known as “Regard” was used to reduce workload burnout for users. According to Regard’s CEO, Eli Ben-Joseph, in a case study with Torrance Memorial Medical Center following 15 users over more than a year, Regard reduced measures of burnout by 50% (Dr. Awan, 2023). Anxiety and depression disorders as well as musculoskeletal and cardiovascular diseases could improve thanks to developments of AI in the workplace.

Another opportunity of AI lies in the field of learning and development. The implementation of AI in the workplace urges workers for a new set of skills, offering employees the opportunity to adapt, learn and grow. Repurposing the skills of those who may be displaced should be a coordinated and sustained effort (van ‘t Noordende, CEO Randstad, 2023). Many companies are introducing reskilling programs to prepare workers and to gain from its cost-saving advantages. McKinsey research shows that redeployment with effective reskilling is 20 percent more cost-effective than “hiring and firing” (Reich, McKinsey, 2023). These reskilling and upskilling programs provide workers with the necessary tools and practices to comply with AI devices and adapt to their new roles. Companies and institutions are incentivizing these practices as it promotes curricula and learning for individuals.

Moreover, AI-related tools are creating new jobs and developing career paths. Universities and educational institutions are offering degrees and courses in data science and AI related subjects.

These educational opportunities can help employees advance in their current job positions as well as enter new AI-focused careers. The learning that is being provided to workers and students will stimulate their intellectual growth and job satisfaction. As a result of this, employees are going to improve their personal and professional development.

5. Conclusions

In this thesis, I have analyzed the all-round impact of artificial intelligence on the enterprise workforce. By studying the origins, types, characteristics and limitations of AI, I have accomplished a profound understanding of the role that AI plays in the workforce context. Through qualitative research, I have gained valuable insights and information from AI related industry leaders; Prosegur and Minsait and excellent AI institutional experts; ONTSI and ISDI. These organizations have given me a perspective of the real-world implications that AI is bringing to their business and to the economy. Coupled with a thorough investigation and research of the global threats and opportunities that AI presents to our workers, my study has provided a balanced and comprehensive view of AI's disruptive issue in the workplace.

In terms of my findings, my work shows the diverse impact of AI on workers. On one side, AI systems have the potential to displace jobs, create worker discrimination, and raise ethical issues about employee well-being. On the other, it has the capability to increase productivity and efficiency, improve safety and flexibility, and create new skills and career development opportunities. These findings suggest that the essential component to harnessing AI's potential in our workforce is to fix a balance by extracting AI's strengths while moderating its threats.

The research done throughout this thesis provides an answer to our study's main objective: understanding and assessing the impact of AI on the workforce. AI's implications are clear; its integration in the workforce of companies must be managed responsibly and sustainably. Policymakers, businesses and workers must not only work to sustainably integrate AI, but also be able to collaborate and handle this technological transformation to prioritize workers welfare.

Due to the immense possibilities in the evolution of AI, as well as the many fields that AI can be applied to, this thesis obviously has multiple limitations. The study relies on information from only a small number of organizations that have direct treatment with AI. Given the diversity and the range of industries that AI spreads throughout, a larger sample of companies and organizations would have given me a more accurate and comprehensive view of the issue. Additionally, the rapid evolution of AI technologies means that implications for workers are

constantly shifting and progressing, and this is recently happening at such a pace that our current understanding could soon become outdated.

As for future lines of investigation, there are several areas within AI's impact on the workforce worth exploring. The first one is the extent of job displacement caused by AI. Although renowned corporations are already providing the public with insights of the devastating effects of AI on the workforce, there isn't yet a definite outcome of its future repercussions. Also, the ideal approach for sustainable implementation of AI in our workplace could be studied more thoroughly, pinpointing the ways to preserve and retain the human labor force. Lastly, another research could be directed to the different strategies for reskilling and upskilling workers. This research would help companies to effectively handle and prepare their workforce, and enable workers to advance their working capabilities in relation to AI. By investigating these areas, businesses and workers can improve their understanding and procedures towards AI's uses in the workforce, ultimately aiming for a future where man and machine can work cohesively and in the best interest of mankind.

6. Bibliography (APA)

Bankins, S., Formosa, P. (2023). *The Ethical Implications of Artificial Intelligence (AI) For Meaningful Work*. *J Bus Ethics*. <https://doi.org/10.1007/s10551-023-05339-7>

Bankless Times. (2022, November 29). *AI could displace 800 million jobs by 2030*. <https://www.banklesstimes.com/news/2022/11/29/ai-could-displace-800-million-jobs-by-2030/>

Boston Consulting Group. (n.d.). *Artificial Intelligence*. <https://www.bcg.com/capabilities/digital-technology-data/artificial-intelligence>

Encyclopædia Britannica. (n.d.). *Artificial intelligence*. In *Encyclopædia Britannica*. <https://www.britannica.com/technology/artificial-intelligence>

Builtin. (n.d.). *Types of artificial intelligence*. <https://builtin.com/artificial-intelligence/types-of-artificial-intelligence>

Economist. (2023, March 6). *Taiwan's dominance of the chip industry makes it more important*. *Special Report*. <https://www.economist.com/special-report/2023/03/06/taiwans-dominance-of-the-chip-industry-makes-it-more-important>

European Agency for Safety and Health at Work. (n.d.). *OSH and Future Work: Benefits and Risks of Artificial Intelligence Tools in Workplaces*. <https://osha.europa.eu/en/publications/osh-and-future-work-benefits-and-risks-artificial-intelligence-tools-workplaces>

European AI Alliance. (2023). *Ethical AI: Performance component, CSR, and ESG*. <https://futurium.ec.europa.eu/en/european-ai-alliance/blog/ethical-ai-performance-component-csr-and-esg>

European Parliament. (2022). *AI and digital tools in workplace management and evaluation*. [https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729516/EPRS_STU\(2022\)729516_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2022/729516/EPRS_STU(2022)729516_EN.pdf)

Forbes. (2022, March 30). *The scarcity of AI talent: A problem of our own making, is a problem we can solve*. <https://www.forbes.com/sites/judithspitz/2022/03/30/the-scarcity-of-ai-talent-a-problem-of-our-own-making-is-a-problem-we-can-solve/>

Gartner. (n.d.). *Gartner Hype Cycle*. <https://www.gartner.com/en/research/methodologies/gartner-hype-cycle>

Gartner. (2023). *Novedades del Hype Cycle de Gartner para las tecnologías emergentes 2022*. <https://www.gartner.es/es/articulos/novedades-del-hype-cycle-de-gartner-para-las-tecnologias-emergentes-2022>

Harvard Business Review. (2023, March). *How AI is helping companies redesign processes*. <https://hbr.org/2023/03/how-ai-is-helping-companies-redesign-processes>

IEEE International Roadmap for Devices and Systems (IRDS). (n.d.). *Semiconductors and artificial intelligence*. <https://irds.ieee.org/topics/semiconductors-and-artificial-intelligence>

Investopedia. (n.d.). *World's top 10 semiconductor companies*. <https://www.investopedia.com/articles/markets/012216/worlds-top-10-semiconductor-companies-tsmintc.asp>

Kelly, J. (2023, March 31). *Goldman Sachs Predicts 300 Million Jobs Will Be Lost or Degraded by Artificial Intelligence*. *Forbes*. <https://www.forbes.com/sites/jackkelly/2023/03/31/goldman-sachs-predicts-300-million-jobs-will-be-lost-or-degraded-by-artificial-intelligence/?ssp=1&darkschemeovr=1&setlang=en-XL&safesearch=off&sh=2fe54864782b>

Levity. (2023). *General AI vs. Narrow AI*. <https://levity.ai/blog/general-ai-vs-narrow-ai>

McKendrick, J. (2023, April 25). *Yes, AI Increases Productivity, Study Suggests*. *Forbes*. <https://www.forbes.com/sites/joemckendrick/2023/04/25/yes-ai-increases-productivity-study-suggests/>

Noordende, S. v. (2023, April 18). *Employees Cannot Wait to Apply AI in Their Jobs; Reskilling Is Critical*. *Forbes*. <https://www.forbes.com/sites/sandervantnoordende/2023/04/18/employees-cannot-wait-to-apply-ai-in-their-jobs-reskilling-is-critical/>

OECD. (n.d.). *Robots and Jobs: Evidence from the US*. *Centre for Economic Policy Research*. <https://cepr.org/voxeu/columns/robots-and-jobs-evidence-us>

OECD. (n.d.). *Workers' Responses to the Threat of Automation*. *Centre for Economic Policy Research*. <https://cepr.org/voxeu/columns/workers-responses-threat-automation>

Panchal, S., & Venugopalan, S. (2022). *Artificial Intelligence-Driven Algorithms Improve an Individual's Ergonomic Safety*. *Occupational Health & Safety*. <https://ohsonline.com/articles/2020/05/14/how-aidriven-algorithms-improve-an-individuals-ergonomic-safety.aspx>

Tavana, M., Davenport, T. H., & Wagner, B. (2023). *How Banks Can Build Their Future Workforce Today*. *McKinsey & Company*. <https://www.mckinsey.com/industries/financial-services/our-insights/how-banks-can-build-their-future-workforce-today>

Technology Review. (2023, February 21). *Automation Drives Income Inequality*.
<https://www.technologyreview.com/2023/02/21/1067563/automation-drives-income-inequality/>

Vogels, T. (2023, April 12). *Artificial Intelligence and Its Potential to Combat Physician Burnout*. *Forbes*. <https://www.forbes.com/sites/omerawan/2023/04/12/artificial-intelligence-and-its-potential-to-combat-physician-burnout/>

World Economic Forum. (2020). *The top 10 work skills of tomorrow and how long it takes to learn them*. <https://www.weforum.org/agenda/2020/10/top-10-work-skills-of-tomorrow-how-long-it-takes-to-learn-them/>