

The impact of technological progress on the labour market

Abstract: *One of the major challenges, if not the crucial one, that politicians and governments will face in the next years is the relationship between technological progress and the social exclusion of those who are neglected by the system of social guarantees that the welfare State is still able to ensure. In this article, I analyse through a critical theory approach how technology becomes a purpose, the impact of technology on the job market and its consequences. I try to provoke some ethical reflection on uncontrolled technological progress and on the role of the man in the next years. The future of the labour market will be changed by a series of factors, some of the most important being shifting demographics, dynamic workforces, the rise of individual choice and especially the technological revolution. Of course, these arguments doesn't mean that technological progress should stop or that I am against technological progress, especially because there are areas where innovations are lifesaving, or reducing casualties in the battlefield or reducing car incidents. The purpose of this research is to question what will be the role of man in the world.*

Keywords: *critical theory; labour market; technology; unemployment.*

Introduction and methodology

The future of the labour market will be changed by a series of factors, some of the most important being shifting demographics, dynamic workforces, the rise of individual choice and especially the technological revolution (Prising 2016).

Shifting demographics, aging and declining birth rates generate a series of issues concerning stagnant or shrinking workforces, labour shortages, a different approach towards migrants, etc.

If we refer to the rise of individual choice, we should be aware of the new trends for multiple careers, the millennials that find it easier to change directions than older generations, the goal being to be employable, to gain the necessary skills in order to change jobs regardless of the employer.

The rapid technological progress had a nonlinear evolution, changing not only the labour force, but also the role of technology in the world, from a mean to a purpose.

In this context, *the research question* of this paper is if technology becomes a purpose, in what resides the impact of technology on the labour market?

In order to better approach this issue, I will also define the following *objectives*:

- Clarify how technology becomes a purpose instead of a mean.

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- Explain in what resides the impact of technology on the labour market.
- Try to explain what will be the role of the man in the coming future.
- Find possible solutions for what should politicians/decision makers do in order to manage these challenges.
- Argue whether we should talk about ethics when we deal with technology as a purpose.

The hypothesis is: if the technological progress became a purpose instead of a mean (as proven using critical theory) then systemic changes occur in the labour market, as some sectors disappear, other suffer major changes and new one arise. The study case will provide examples for each of these cases.

I will use a critical approach on the *acritical positivism* and the *expected conclusions* are that technological progress is vital for some sectors but when technology becomes the purpose, a fundamental concept is lost – that technology must respond to the needs of man, not to use the man.

Moreover, just placing technological progress as an independent variable shows that in the age of technology, man is only an instrument not an end in itself.

Of course, these arguments doesn't mean that technological progress should stop or that I am against technological progress, especially because there are areas where innovations are lifesaving, or reducing casualties in the battlefield or reducing car incidents. The purpose of this research is to question what will be the role of man in the world.

The methodology consists mostly in qualitative analysis, historical description of certain facts, content analysis, trend analysis. The theory used is represented by the critical theory because it better explains the vision of technology as a purpose, as the first part of the paper will prove. Further the paper provides a series of definitions in order to better understand the concepts and the relation between them and also a historical perspective on the subject of this essay. The case study analyses the impact of technological progress on the labour market and on the main sectors affected. We will also argue if there is ethics when we deal with technology.

In the end, I emphasize that in some parts of the chapters' Critical theory, Definitions and History of Technology, I started from previous research interests, approached in the paper entitled "The raise of Nationalist and Populist in the EU. Cause or Symptom of the Political Crisis?" which it will be published in the EURINT proceedings 2017.

Critical theory²

The critical theory can be included in the normative theory. This theory starts from the question "what is the best way to live?", with roots stretching back to ancient times and concerned with thinking about the world not only as it is but also as we might think it ought to be. Nowadays, the question of the "best way to live" must be mediated with issues like free choice, living in a world where liberal themes as individual freedom and moral egalitarianism are shared values (Marsh e Stoker 2010, 156).

The term "critical theory" is associated with a strand of thinking developed in the mid-20th century and tied originally to the work of the Institute for Social Research established in Frankfurt in 1922. This institute was created by a group of Marxist' intellectuals and it was not named "institute for Marxism" only for reasons of academic opportunities. In short times the institute was recognized by the University of Frankfurt and by the government. The Frankfurt

school produced at least two theories similar but not entirely identical, the first is developed by the generation of Horkheimer, Adorno and Marcuse, one developed by Habermas.

The theory is called critical because not only aims to interpret - explain the world, but to follow the actual movements toward overcoming it. In this scenario, it may notice the similarities with Marxism and from this, I can define this theory as a neo-Marxist theory. This theory is characterized by the multidisciplinary and interdisciplinary nature of the contributions, because the philosophy (especially ethics) only meeting the social sciences can perform its tasks in the advanced capitalist societies. According to the model of critical theory developed by Horkheimer, the relationship between the two contexts must be conceived as a loan consolidation ratio: philosophy should have been supporting the critical reformulating of the positivist assertions and metaphysically founded specific on the social sciences. Social sciences, in their turn, would be essential for an authentic critique of the status quo, since philosophy, for its part, would have long left the task to give an account of reality. At the basis of this form of interdependence resided the conviction that philosophy, like any other scientific enterprise, could no longer be conceived as separate from social reality. In other words, the idea that it is an integral part of reality that studies and thus is influenced by that same reality on the one hand and on the other, is conditioned by it.

Critical theory aims to relate the Marxist theory of alienation with the Weberian theory of rationalization and, in the background, the Freudian unconscious theories. In fact, this theory focuses on the criticism of the forms assumed by bourgeois society of mass rather than on capitalism as such.

Critical theory is structured around the conflict between the objective reason (ideal plan) and the subjective reason (or instrumental). With objective reason means that reason that belongs to philosophy and refers to the general interest dimension, the sense of human emancipation. That is to say the Truth. With subjective reasoning means the reason which refers to the desire and interests of the individual subject, and which manifests itself as a means to effectively achieve a goal, that is, the primacy of profit.

In the first school of Frankfurt, connected to Adorno and Horkheimer, the method was to bring out the false division between subject and object, universal and individual, society and the individual, because for the authors were contradictions.

For authors just mentioned, society is not a "thing" separate from the individuals but it is a moving totality: philosophy, theory and empirical elements move together to unveil the reification. Last major topic of critical theory is the critics brought to Enlightenment. The absolutization of reason will transform over time in this last technology and instrumental reason that makes new myth and instrument of domination and enslavement, reversing the intent emancipatory of the Enlightenment. Modern society is the one that best presents itself as totalitarian and as final. This society produces an ever-growing gap between ever-renewed desire for emancipation and reification. The present society, than, makes use of science and technology to build a complete and all-pervasive form of social control: it can be said that the instrumental rationality means alienation. In this context, the political totalitarianism is transmuted into social totalitarianism, *creepy*, soft, which turns the subject to be consumerist, who live in a consumerist society, that can also transform the culture in industry.

Definitions

Trying to summing up the definition of *téchne*, I could say that there are two main school of thoughts oriented on the study of *téchne*: one of them states that *téchne* is neutral (Raisi 1990, 74) and its significance resides in the way the man uses it. This approach is presented by the positivist philosophers, who argue that the industrial revolution created a rational society. Another one developed by Heidegger, the Frankfurt School and deepened by Severino and Galimberti, argues that *téchne* become purpose, instead of mean. Supporting this approach, the French philosopher Alain de Benoist sustains that *téchne* is not neutral, but obeys to a number of values that establish a certain sense of direction: operativity, efficacy, capacity to perform. Its axiom is simple: everything that is possible could be and will be effectively realised from the moment when only a surplus of technology could remediate the errors of the commissioning of existing technology (De Benoist 2012, 49). While in ancient Greece *téchne* meant “art” in the sense of “know-how” and, until the nineteenth century, was associated with “progress”, later it will be associated with “risk”, as Natoli explained in the conference *Tecnica e rischio* (Natoli 2004, 71). Günther Anders, in his book *Die Antiquiertheit des Menschen*, is even more tragic than Natoli, claiming that today the man is nothing more than an appearance compared to the *téchne*, the true subject of the current history (Anders 2016, 7). I could summarize the notion as the relationship between man, nature and the will to power. In this article I will consider the switch to Age of technology when technology has become purpose, showing that everything is achievable, it will be realized; without considering any ethical question.

ISO 8373³, the International Standardization Organization, defines industrial robots as industrial robot automatically controlled, reprogrammable, multipurpose, manipulator, programmable in three or more axes, which can be fixed either in place or in mobile for use in industrial automation applications. If we are to give a more recent approach, according to Robotiko, an Italian blog that deals with sharing the progress of robotics, robotics is an interdisciplinary science that deals with the design and development of robots. The main activities of this blog is to describe “an engineering discipline that is coming out of the labs and is entered quietly into our daily lives” (Blog Robotiko 2017). Robotiko also describes the various fields in which robotics is used. Industrial robotics, for example, exempts man from arduous and repetitive work. Robotics in medicine allows doctors to do precise work and with little margin of error. Finally, educational robotics need to accompany children in the learning process. Author Kurfess explain that the word robot itself comes from Czech *robota*, “servitude, forced labour”, and was coined in 1923 (Kurfes 2005, 4). Even for Kurfess, robots serves to substitute the human being in tasks that are boring, dangerous or in which robots can perform better than humans can. Trying to give a wide and a narrow definition of robotics, I can state that a wide definition of robotics is any machine used to repeat human movements, from automated and repetitive ones to those of medium-large difficulties. A narrow definition of robotics means that instruments can substitute the man in working activities. In this article, I will use a narrow definition of robotics, because I will not pursue topics such as biotech and bioethics.

The *labour market* is the place in which men find work and employers find willing workers. The result of the meeting between demand and supply of labour is the wage. In case of equilibrium, the wages tend to remain constant and there is not labour offer excess or deficit. We need to add to this model some generated distortions as, for example, the taxes cost. If we add supply costs, the equilibrium tend to decrease. A difference between demand and supply

of labour create three types of unemployment: the structural unemployment⁴, the frictional unemployment⁵ and the cyclical unemployment⁶ (Stiglitz 2001, 80-83). The consequences of unemployment can also lead to the loss of the self-estimate, as underline the Nobel Prize Joseph Stiglitz (Stiglitz 2001, 80).

The labour market may be local, national or international. Every technological innovation means that the supply of labour is low down. In this way, the point of equilibrium is established with less people employed at a lower wage. In this way, although new jobs arises, it decrease the overall value of wages paid. In this case, a wide definition of labour market includes problems with difference of tax treatment on labour, with frictional unemployment, with migration. A narrow definition of labour market concerns only the encounter between demand and supply of labour, giving attention to the equilibrium and the structural unemployment.

In this article, I will use the narrow definition of labour market, considering the issue of the labour market as a worldwide problem in the age of technology.

History of technology⁷

Galimberti (Galimberti 2009, 4) and Iannone (Iannone 2016, 16) argue that technology was introduced in history through the theft of fire in the myth of Prometheus. In this context, it is important to mention that Zeus will then distribute two virtues, modesty and justice, to ensure that man becomes sociable, in other words the *zoon politikon* which will be described by Aristotle (Aristotele 2014).

Plato, in the Protagoras, theorized the fact that man is free of instincts: “Zeus assigns Epimetheus (epi-metis, he who thinks afterwards, and therefore he who is improvident, the unwary one) with the task of attributing qualities (instincts) to all living creatures. By the time, he arrives at man Epimetheus has no qualities left, as he has been too liberal to start with. Zeus, moved by faith of man, asks Epimetheus’ brother, Prometheus (pro-metis, he who thinks before) to endow man with his own quality of foresight or prevision” (Galimberti 2009, 4). The man must create an environment friendly to him, being not an animal with instincts.

If nature was not subordinate to men in ancient Greece, the advent of Christianity will be change the paradigm. For Christians, nature is subordinated to God and man, who remains on this earth waiting for death. That is how it was born the immeasurable “will to power” of man who is founded in the fact that God is transcendent with respect to the world (Iannone 2016, 17). Galimberti underlines two quotes, one of Heraclitus and one of Genesis to show the different conception that the Greek man and the biblical man had of himself and the world. The fragment thirty of Heraclitus states: “‘This cosmos, which is the same in front of us, not one made by gods or men; but it was ever, is now and ever shall be an always living fire blazing up according to measures and switching off according to measures’. Instead, the Bible states: ‘in the beginning God created the heavens and the earth. Now the earth was formless and empty, darkness was over the surface of the deep, and the Spirit of God was hovering over the waters. And God said, *Let there be light*, and there was light. God saw that the light was good, and he separated the light from the darkness. God called the light *day*, and the darkness he called *night*. And there was evening, and there was morning – the first day’” (Galimberti 1999, 283).

Plato, Augustine and Kant had warned that there is no continuity between the animal and man, since animals react to instinctual stimulus while man is living and acting, and in order to survive is forced to build a world to remedy the lack of a suitable environment.

The primacy of scientific thought corresponds to the modern era. The motto “*Scientia est potentia*” by R. Bacon, provides what will be the future and, therefore, the removal of the measure from the Greek’s ideal and from humility of the Christians (Iannone 2016, 19).

In 1945, August 6th was the day zero of a new computation of time: the day from which humanity was irreparably able to self-destruct (Anders 2008, 73)

The correspondence between technological progress and capitalism heads us to the present world. The atomic bomb is the watershed between a commodified world and a world that is not just at the will of goods, but of its blind production using machines. Anders calls it the “principle of the mechanical”: we produce technical machines serving for our work, for our entertainment, for our annihilation (Anders 2008, 7-8).

Episodes such as Hiroshima and Nagasaki have shown to the world that the man is not aware of the side effects of its inventions, but, above all, it has shown how difficult it is to find a correlation between the initial experimental investigation and the “finished product”/outcome (Iannone 2016, 53).

Heiddeger classifies technology in two categories, the *producing technology* and the *provocative technology* (Iannone 2016, 50). While the *producing technology* does not change the nature, such as the mill, it is the *provocative technology* that changes the nature in a definitive manner, such as a dam. The provocative technology changes the man in the sense that he begins to feel “master of the earth” (Roberts 2012, 28). Provocative technology includes what Nacci defines *large technical systems*, as great technical and organizational systems that spread their networks over vast territories. Consider, for example, the railways, the electrical systems, the internet (Consarelli 2006, 36). As seen in previous industrial revolutions, the machine stripped away the usefulness of previous instruments, but today this is trivialized by the introduction of large technical systems, which transform it into a consumable product. The large technical systems must be seen as a framework that guides the entire practical act of modern societies (Consarelli 2006, 43). Author Nacci (Consarelli 2006, 35) mentions the thought of Gras, who is convinced that the advent of the large technical systems brings with it a radical new model of organization, ready to redefine the whole structure of life in developed societies⁸ (Consarelli 2006, 40).

As claimed by Schraube, technology, “also frees us from the constraints of nature, there is a shield from the pain and suffering, and lightens our daily lives. However, it would be simplistic to consider the technical development of an area without ambiguities and contradictions. Schraube refers to the public belief that the technical products are the solution of human problems. The belief in progress mystifies *created goods*, and it’s - despite all the experiences - still deeply rooted in our society” (Schraube 2010, 74-75). In this respect, Iannone defines uncritical adherence to *téchne*, coming to consider technology as being neutral, and neither good nor bad, with both advantages or disadvantages, depending on how you use it. However, according to the Italian philosopher, it is wright that the most radical form of totalitarianism is not understood, the technique affects today “every area of the social organization, enough to result more and more homologation from the point of view of the images produced, the theoretical basis and the truth of which is the carrier, but, above all of our ability to orient ourselves in the world” (Iannone 2016, 7-8). Moreover, Alain Gras argues that “politics today

is wearing new clothes of which technology draws the storyline. This is why science and technology, far from being autonomous, take a social discourse and “secretely/underhand” impose a new sovereignty”, (Consarelli 2006, 46) by placing the entire political space under question (Iannone 2016, 8).

In 1959, Heidegger offer this reflexion “because if it is not worrying that the world will turn into a complete domination of technology, it is the fact that man is not prepared to this radical shift” (Heidegger 1983).

Today, technology is “everything”. Being independent from religions, faith and ideology, has debased every knowledge and changed reality, by changing the way in which man lives in the world.

How the labour market changes. The impact of technological progress on the labour market and on the main sectors affected

The introduction of robotics in the industries is a double-edged sword. On the one hand, we have seen how it has helped man to improve productivity and to reduce the risks of accidents at work. On the other, with the transition to Age of technology, we are witnessing the de-personalization of man, to which is taken away one of the most important goals of his life, the opportunity to work.

The mainstream media welcome with positive emphasis the human replacement made possible by robotics⁹, because they claim that the robotization of labour will create other jobs.

Effectively, old jobs are the most dangerous and underpaid and new and more intellectual work could allow man to do what he wants. New jobs, according to the more positive point of view, gives to the man possibility to realize himself. In this scenario, we may face the disappearance of some jobs like drivers, medical assistants, builders and sellers. In the same time we will ready to see a society based on engineers, etc.

Starting from the critique of positivism with which generally assesses the impact of technological progress, in this chapter I will explain when start the robotization of the jobs, which jobs are likely to disappear and what works will (maybe) survive in the Age of technology.

As claimed by Natoli, today, technology is “producing a world”, not mere knowledge that you have to adapt to the world (Natoli 2004, 72). In the world of work, this change of attitude was made possible by the adoption of two technologies the big data and the internet of things.

The big data are the data collected with huge size in terms of volume and velocity. To extract values must use technologies and analytical methods (De Mauro, Greco and Grimaldi 2016, 124-125). For the authors Sagioglu and Sinanc the big data and its analysis has become the core of modern science and business (Sagioglu and Sinanc 2013, 42). If machines cannot think and reason like human, robots are able to reprocess data even better of humans do; the Citibank report underlines how big data can replace the implicit human knowledge workers possess (Frey and Osborne 2015, 24).

The amount of data is increasing since the 1990s¹⁰, and in this context, as Sagioglu and Sinanc underline, there is a challenge not only in collecting and managing the vast volume and different type of data, but also to extract meaningful value from it. Also there is a need, for managers and analysts with an excellent insight of how big data can be used. The big data can

be used on web marketing, in collecting business insights, to segment the clients by his behaviours, to analyse business alteration and to recognize sales and market chances (Sagioglu and Sinanc 2013, 46).

The unquantifiable increasing of big data is due from the realization of the Internet of Things (IoT) (Palanza 2016, 7). Introduced by the MIT' researcher Kevin Ashton in 1999 this concept mean the connected objects able to transfer into the network large volumes of information and data. Unlike the first computers, the internet of things regards small objects do not necessarily powerful that can be used every day (Palanza 2016, 2). IoT is opening new areas to its application, which is why it is attracting the attention of many researchers and many engineers around the world (Xia, et al. 2012, 1101).

Certainly, the impact of big data and IoT in the Age of technology has easily demonstrable consequences. According to the report of Citibank, annual supply of industrial robots in Europe was of 41.218 unity in 2012, of 46.000 in 2014 and it is expected that in 2017 the unit will arise until 55.000 units (Frey and Osborne 2015, 4).

As I said, the Age of technology also offers new jobs that never existed before. The rise up of the use of big data and IoT generate related jobs as the creation of infrastructure for the transmission of data, the maintenance, the data governance and its visualization (Sagioglu and Sinanc 2013, 46).

As underlined in the Citibank report, jobs that are at low risk of being replaced by robots are those who need creativity and capacity of interaction in society skills. The authors continue to explain that computers do not yet have human abilities in complex interactions, in negotiations and persuading, but, above all, they may not yet have original ideas. In this scenario, management, business, finance, education and healthcare, but only when these jobs are not fully automatable (Frey and Osborne 2015, 59).

Despite this positive background, it is the same report that states that no single industry is completely immune to the expanding role of the robotization. In a high skills sector as the Finance and Insurance, the 54% of jobs are at risk (Frey and Osborne 2015, 61). In the newspaper *Il Corriere della Sera* the journalist Massimo Gaggi questions if the robots will steal the work to the lawyers. The author first critiques Donald Trump, guilty to look of the companies that have delocalized, but he do not care of enterprises that replace thousands of workers with the use of automatic robots, and then recognize that the problem at the moment has no solutions. The conclusion is devoted to "Ross", a robot "hired" by the American law firms that is able to search cases similar to the analysed one from past judgments (Gaggi 2017).

Only in the EU, the jobs at risk are 54% of those we know today, ranging between 47% in Sweden and 62% in Romania. The forecasts that we have today, however, are not certain: every day we discover new technologies to date unforeseeable, in this way (in my opinion) can never make an exact estimate, as new technologies not only replace humans, but also change the production system as a whole. Ironically, neither the IT labour market will be exempt from the changes induced by technological progress; it will lose 25-50% of the jobs because of the automation with software (Frey and Osborne 2015, 30).

The service industry was both helped and damaged by the technological progress. The 58% of jobs in the administrative sector is at risk automation, but the work related to human attributes is difficult to be replaced in a short time. Management, strategy and judgment are not replaceable characteristic of the human being (Frey and Osborne 2015, 30-31). The bank sector, through the digitalisation of the bank services, is changing. The future will consist more in

machines and more mobile interactions. This will cause that bank companies reduce staff and increase the advisory staff (Frey and Osborne 2015, 25).

To give another example, in healthcare applications, robotics is already used. The precision with which the machines assist the man, performing operations, monitoring patients and sometimes substituting pieces of body organs (as pacemakers does) suggest that the trend will hardly decline (Frey and Osborne 2015, 38).

Further, in the military sector the use of drones is even more frequent. Jay Galliot explains what is a drone – “a robot that do not have an on board human operator, is designed to be recoverable and in a military context, are able to exert their power in order to deliver a lethal or nonlethal payload or otherwise perform a function in support of a military force’s objectives” (Galliot 2015, 5).

Concerning military use of technology, the report of Citibank identified two scopes: remove the soldiers from the battlefield and get better intelligence and surveillance. The occidental armies have a goal to create smaller military. The future’s army will be more agile and lower budget will be necessary because of technology. Even the Citibank report question if the Military automation have ethical consequences, however, the considerations are different from those incurred in this article. For the authors of the report, the use of technology is not unethical in itself, only the wrong use of it could generate ethical concerns (Frey and Osborne 2015, 34-35-36-37).

After reviewing some sectors that already have changed, we will further refer to some sectors that will change in the future and will have a great impact on the labour market.

Advanced Driver Assistance Systems or ADAS is a technology that aim to support drivers, automatizing some of the procedure. Replacing some human driver decision, ADAS can eliminate many of the driver error - which are the origin of 90% of road accidents (Il Fatto Quotidiano 2015), bringing even environmental benefits (Piao and McDonald 2008, 659). According to forecasts of the Citibank report, the substitution of the human driver will take place after 2022, dividing the stages of ADAS in four phases. The first was the one that cars start to be produced with sensors. The second (which will end this year) provides for the automation of the brakes and throttle, using GPS. The second phase, which will end in 2022, cars will be able to drive by themselves but the human being is to be in the car to handle emergencies. The fourth and final stage involves the use of machines without driver. The same report, however, states that in the next ten years “only” a number between ten and thirty percent of the drivers will lose their jobs (Frey and Osborne 2015, 51-53).

The invention of 3D¹¹ printers could not only present replace humans in a particular sector, but to change the whole production system, leading consequences in geopolitics, economics, social, demographic, environment, and security (Banning, et al. 2011, 1).

The 3D printer changes the paradigm of production because the products can be printed directly in a single process, unlike today that are assembled several pieces. The robot will not be re-programmed to produce different products, being merely a file to print. Through 3D printers, will no longer be the products but projects to travel the world. It is no longer necessary relocation, it will be an opposite process to globalization, because the products may be print in remote corners of the earth. In this way also the transportation costs will be reduced drastically, being only required an Internet connection. We should ask ourselves the maximum limit on the size of printable products through 3D printers, even if the answer is given by the facts: an Italian company has invented a 3D printer, which, based on the system of construction of hives

by potter bees; it will be able to achieve houses made of clay (Luna 2015). Large industrial districts, including those who have so far resisted the globalization and robotics, will be further challenges. In this scenario, it is not impossible to think to “big ghost town”, legacies of a production system that will be exceeded. Unlike the other labour market sectors affected by technology, the 3D printers can create jobs in niche manufacturing industry. Probably also because the manufacturing is the sector with the most employees since 1950 (Frey and Osborne 2015, 55).

After I have envisaged the changes that will affect the labour market, I can say that, as in every revolution, the age of technology has winners and losers. The reduction of production costs favours the shareholders that will invest less than in the past. At the same time, consumers will have access to a larger number of products. In this way, however, the concentration of capital will be even faster questioning the established order. We can consider, for example, companies with larger budgets than entire states. To better understand the phenomenon, I can refer to this example: in 1990, the three largest companies in Detroit had a market capitalisation of \$36 billion and they offered a job to 1.2 million of persons. Today, in 2014, the equivalent of the three companies in the Detroit district, the three biggest companies in the Silicon Valley, have a market capitalisation of \$1.09 trillion, occupying only 137.000 persons (Frey and Osborne 2015, 7). However, we can think of China, it is losing its competitiveness because wages are growing more than productivity (Frey and Osborne 2015, 43) and it has chosen to invest in robotics¹², proving that even a socialist regime is not immune by the advance of technology as a final purpose.

To understand how technology may affect labour markets in the future, the Citibank report will argue that we need to understand the direction of technological progress, and thus the near term bottlenecks to our engineering capabilities (Frey and Osborne 2015, 22). Moreover, just placing technological progress as an independent variable shows that in the age of technology, man is only an instrument not an end in itself.

In the Age of technology, ethical issues are multiple. They are not only those seen in the military sector, problems related to privacy, to security, and why not, to the role of the man in the world, that needs to be addressed before it will be too late.

Galimberti, alarmingly, argues that it is actually too late. The Italian author sustains that in the age of technology ethics is powerless as it fails to prevent the technology of doing what it can. So if ethics in the past controlled “the action”, it cannot control “the make”. Neither the ethics of responsibility of Max Weber - which, whereby, the actions should also be ethically evaluated for results and not for just intentions- is sufficient to give an ethics to technics; in that the technical inventions are not always used for the reason for which they were designed (Galimberti 1999, 457-466).

On the contrary, offering a possible solution, Loi argues that technological innovation under current socio-economical institution is associated with a significant risk of human (welfarist) disenchantment¹³, hypothesizing ethics committees to protect the interests of human workers (Loi 2015, 208).

Trying to be less negativist that Galimberti, we have to bear in mind the fact that this technological progress infringe kantian principles¹⁴ as: man is a purpose in itself, imperfect moral duties in front of himself in order to develop his qualities and in front of others in order to help others. In this case, the question about if the man is respecting the kantian categorical imperative arises. To reply to this question, we need to bear in mind that, by the principle of mechan-

ical, the man is able to create machines by other machines, and, in the same time, he is able to destroy the whole humanity with the machines he created. Even in the Kantian imperfect moral duties rises some questions: (in front of us) are we respecting that if we use machines that solves problems and allow us to ignore some topics? (in front of others) are we helping others when our purpose is to introduce new technologies with the sole purpose of economical rationality?

Conclusions

The changing nature of technology from a mean to a purpose is an ethical problem because, as seen in this paper, technology as a purpose is not only a matter of man to technology relation, but also a matter of man to man relation.

The research question of this paper was if technology becomes a purpose, in what resides the impact of technology on the labour market?

To sum up this research, I have clarified how technology becomes a purpose instead of a mean, I have explained in what resides the impact of technology on the labour market and explained what will be the role of the man in the coming future. I have also indicated possible solutions for what should politicians/decision makers do in order to manage these challenges.

The hypothesis was: if the technological progress became a purpose instead of a mean (as proven using critical theory) then systemic changes occur in the labour market, as some sectors disappear, other suffer major changes and new one arise. Moreover, just placing technological progress as an independent variable shows that in the age of technology, man is only an instrument not an end in itself.

As I have previously argued, these arguments doesn't mean that technological progress should stop or that I am against technological progress, especially because there are areas where innovations are lifesaving, or reducing casualties in the battlefield or reducing car incidents. The purpose of this research was to question what will be the role of man, what we will do with the man.

After analysing these phenomena, we identified two scenarios regarding the role of the man in the future.

The first scenario refers to the man without purpose in his life, despite the humanist principle of progress stating that through studying and working the man can progress itself. From this, arises another question – how could a man live without a purpose – but this will be a different question to be elaborated in other papers.

The second scenario refers to starting again from the humanities such as history, art, philosophy and music. These subjects might help avoiding the creation of an army of soldiers homologated to the technique without creative spirit and imagination. In other words, politicians and decision makers should foresee the future of the labour market and adapt the curricula preparing “humans”, not workers. However, the relationship between man and the nature must also be reconsidered because only starting an organic relationship between man and nature we could stop this run for technological progress in itself.

Although the purpose of this paper was not to resolve the entire subject of this substantial topic, hopefully it has provided some useful arguments and a framework for researchers.

The technological progress is vital for some sectors but when technology becomes the purpose, a fundamental concept is lost – that technology must respond to the needs of man, not to use the man.

Notes

¹ His research interest are Philosophy of Technology and the Impact of the Technological Progress in Society and Politics. Now he is studying the Impact of Technological Progress with a Global Justice Approach. He have participated at the EURINT International Conference “European Union at crossroads: building resilience in times of change” with an article entitled “The raise of Nationalist and Populist in the EU. Cause or Symptom of the Political Crisis?” which it will be published in the EURINT 2017 Proceedings.

² Part of this findings is based on: (Bohman 2016) and (Bedeschi 1998).

³ <https://www.iso.org/obp/ui/#iso:std:iso:8373:ed-2:v1:en>.

⁴ The structural unemployment is the unemployment that becomes from an absence of labour request.

⁵ The frictional unemployment is the unemployment that comes when people change job, city or career.

⁶ The cyclical unemployment is the unemployment given by the opposite direction of the GDP growth and the unemployment rates. When the first one growth is small or negative, unemployment grows up.

⁷ Part of this findings is based on: (Galimberti 1999) and (Iannone 2016).

⁸ For Iannone, however, globalization plus capitalism will make these reflections valid in the entire world (Iannone 2016, 41).

⁹ The American newspaper *New York Times* published on its website an article entitled: “A Robot may be training to do your job. Don’t panic” (Levit 2016). The Italian newspaper *La Stampa*, in the same wave, published an article entitled “Buona notizia: i robot ci rubano il lavoro” (Sabadin 2014).

¹⁰ The Citi bank report quote a prevision of Cisco System in 2012, explaining that in 2016 the internet traffic was 1 zettabyte – 1×10^{21} bytes), in comparison, the books printed in the all world were about 480 terabytes (5×10^{14} bytes) (Frey and Osborne 2015, 23).

¹¹ Also called Additive Manufacturing.

¹² In 2013 China becomes the largest market for industrial robots (Manjoo 2017).

¹³ With the concept disenhnancement the author means the opposite of enhancement, rather “reducing” human abilities or worse, it decreases chances for a good life (Loi 2015, 203).

¹⁴ These principles were deeply analysed by: (Singer 2006, 205-215).

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