

## **MIGHT DIGITAL REVOLUTION BE A THREAT FOR EMPLOYABILITY?**

*A Revolução Digital pode ser uma ameaça para a Empregabilidade?*

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### **ABSTRACT**

The present study aimed to discuss the 21<sup>st</sup> Century digital revolution and its impact on the employability of individuals, and how they can be prepared to reinvent themselves to face the new demands of the labor market. Recent developments in computing, robotics and artificial intelligence have developed even more powerful systems, showing to be capable of performing complex tasks, previously performed only by humans. In this sense, when analyzing societies connected by a bunch of technological resources integrated into a networked system leads us to think about the employment scenario in near future, considering the importance of preparing ourselves to guarantee our existence in a highly challenging and, yet unknown context. The likely outcomes of this revolutionary transformation depend on how the gains are distributed as it is already perceived a deterioration of inequalities in the labour market. What is expected is that impacts generated by the digital revolution on employability might be more socially fair and economically prosperous for all parts involved.

**Keywords:** Digital Revolution, Employability, Artificial Intelligence, Information and Communication Technologies.

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## **A REVOLUÇÃO DIGITAL PODE SER UMA AMEAÇA PARA A EMPREGABILIDADE?**

*Might Digital Revolution be a threat for Employability?*

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### **RESUMO**

O presente estudo teve como objetivo discutir a revolução digital do século XXI e seu impacto na empregabilidade dos indivíduos, além de avaliar como eles podem se preparar para se reinventar visando enfrentar as novas demandas do mercado de trabalho. Avanços recentes em computação, robótica e inteligência artificial desenvolveram sistemas ainda mais poderosos, mostrando-se capazes de realizar tarefas complexas, antes realizadas apenas por humanos. Nesse sentido, analisar sociedades conectadas por um conjunto de recursos tecnológicos, integrados em um sistema em rede, nos leva a pensar o cenário do emprego em breve, considerando a importância de nos prepararmos para garantir nossa existência em um contexto altamente desafiador e ainda desconhecido. Os prováveis resultados dessa transformação revolucionária dependem de como os ganhos são distribuídos, pois já se percebe uma deterioração e aumento das desigualdades no mercado de trabalho. O que se espera é que os impactos gerados pela revolução digital na empregabilidade sejam socialmente mais justos e economicamente prósperos para todas as partes envolvidas.

**Palavras-chave:** Revolução Digital, Empregabilidade, Inteligência Artificial, Tecnologias de Informação e Comunicação.

## INTRODUCTION

The contemporary perspective on the state of the art of effects of the digital revolution on employability has generated intense discussions among scholars around the world and, in this sense, the main concerns are over the possibility of mass unemployment in the coming years. For the purposes of this study, the word employability refers to “the individual characteristics of the worker capable of protecting him/her from unexpected unemployment, maintaining his/her ability to obtain a job” (Lavinias, 2001, as cited in Helal, & Rocha, 2011:2).

Different from earlier technological revolutions which effects generated improvements on productive processes, the so called fourth technological revolution seems to replace human beings in various tasks of the productive sector, threatening conventional job schemes.

This growing concern about mass unemployment, especially caused by fast advancements of Artificial Intelligence (AI) is legitimate, especially since the first industrial revolution. By that time, society has been structured around employment, which has been the basis of society's livelihood ever since.

If, from one hand, technological advancements generate substantial improvements in people's living standards and highly relevant contribution in the most diverse areas of knowledge; on the other hand, it shall generate fast job obsolescence which may lead to unemployment and an increase of inequality.

## 1 THEORETICAL BACKGROUND

According to Meyer (2014), in this new age, many workers shall be exposed and vulnerable to those technological changes and considering these circumstances, new policies shall appear to guarantee that benefits of technological advances may be spread evenly throughout society, to inhibit a very likely increase in inequality.

Since the introduction of manufacturing and automation in the production process, back to late 19th century, technology's defenders claim that the use of technologies are beyond workers' benefits, for example, becoming more productive and stimulating the increase of income to generating demand for all types of products and, therefore, a lot of new jobs (Earnest, 1973; Gudwin, 2005; Berg, Buffie, & Zanna, 2016).

In another perspective, a more pessimistic version reveals that part of the increase in the inequality, in many developed economies in recent decades, could be as results of the technological pressures. As an example, McQuarrie (2017) reports the consequences of the deindustrialization that took place in the upper Midwest of the USA in 2007.

The industrial economy found in the Midwest of the USA has been replaced by different economic activities, such as financial and service ones. Therefore, there was a replacement of industrial workers by accredited and specialized professionals.

This change in the structure of the economic sector ended in a status of conflict between industrial workers and these other professionals. Also, it generated unemployment and other side effects, such as a fiscal crisis, leading to destruction of assets, bankruptcy of small businesses, more crimes and depopulation.

Furthermore, in the most developed countries, at the company level, the information and technology (IT) revolution reduced the demand for jobs whose tasks were routine processes (physical or mental), such as accounting or production lines, combining computers and smaller and more qualified teams, generating cost optimization for the company (Berg, Buffie, & Zanna, 2016).

Thus, it is possible to note that the transition from “traditional” to “modern” society produces challenges for the social order. When communities experience this type of transition, world views, social arrangements, investments, and individual trajectories are to be questioned (Mcquarrie, 2017).

From this perspective, the introduction of rapid changes, promoted by an increasingly digital society, implies in disruptive innovations in modern society, as well as in the corporate universe. Almost nothing escapes from these inevitable effects. The digital revolution imposes on all sectors of the economy and society, the need to adapt to new technological demands and about employability.

At this point, it is worth saying that employability, for the purposes of this study, it is limited to the professional skills that an individual must have to become employable in the new digital context.

If the world is changing so rapidly and profoundly, the concept of being employable is directly affected by transformations of this new era. Thus, we are induced to think about what has changed and what, inevitably, we must change to adapt to this new moment, from a professional perspective.

This time, it is not about just a merely capitalist aims of reducing costs and maximizing profits, as in earlier revolutions; now, it has infinitely greater amplitude. It is about knowledge, quality of life, competitiveness, connections, among many other results that the digital revolution has presented itself. In Soares' view (2018:5),

A miscellany of types of knowledge expands on the horizon, growing in an unmeasured way, different from what happened in the previous century, when the continuous evolution presented industries in the search for productivity and cost reduction.

Regarding to digital revolution, nowadays, it is possible to affirm that its constitution and framework are a bunch of resources acting as an integrated, systemic, and high complex ways. Everything is closely related to generate a complete transformation, fostering a new society, new demands and needs, habits, and lifestyle. All of these reflect on the construction of knowledge, holistic interactivity, production of new knowledge and, more specifically, on a new way of thinking about employment.

One point deserves attention in the digital revolution phenomenon is that, among the available and integrated resources, artificial intelligence (AI) occupies a prominent place, due to its unique role of performing professional activities only performed by humans before. It is worth noting that AI itself does not affect employability, but considering the entire context, it impacts employability on a greater or lesser degree (Padios, 2017).

From this perspective, it is important to clarify the concept of artificial intelligence as “a scientific discipline that uses the symbol processing capabilities of computing, in order to find generic methods to automate perceptual, cognitive and manipulative activities, through computer machines” (Pereira, 1988:2). In this way, it explains the evolutionary ability, in terms of absorbing repetitive tasks to the most elaborated skills of the human mind.

However, from the perspective of the performance of AI, it is possible to note that the digital revolution nowadays, different from the first industrial revolution (which employment was based on tasks), shows its differentiation precisely at this point. According to Huang (2018), the replacement of jobs by AI, *a priori*, occurs, fundamentally, at the task level, rather than the employment level, and for “lower” level of intelligence, easier for AI. Initially, AI started replacing some simple tasks performed by humans, a transitional stage; then, it seems to move forward to replace the entire human work.

Despite many pros and againsts aspects on AI, “we’ve unleashed the power of AI without fully understanding its impacts” (Wittenberg-Cox, 2022). The purpose of this paper is to present the real manifestations of its performance to build an assertive analysis of contributions, from the perspective of the impact on employability.

As highlighted by Huang (2018:2), “this revolution and threat of AI generated a multidisciplinary reaction at the research level”. There are two progressive streams referring to AI: one referring to the literature of services and technologies, which leads to draw attention to the positive aspects of its performance, and the other related to the economic literature, which tends to focus on the effects of AI on jobs.

As Huang (2018) has pointed out, even low skilled jobs related to the service sector, which was considered more difficult to be absorbed by AI due to a greater dependence on contextual understanding and spontaneous interactive communication, are already, in good part, absorbed by this technology. As an example, “social robots, such as *Pepper*, are used to replace human receptionists to welcome customers” (Choudhury, 2016, as cited in Huang, 2018:1).

Therefore, when analyzing the performance of AI during the past years, it is noticed that it has been very impressive the advancement of this technology on the replacement of human tasks, resulting in predictable changes over time. Important implications of this theory are that analytical skills will become less important over time as AI may assume tasks more related to competency and more intuitive and empathic skills. Eventually, intuitive, and empathic skills, performed by AI, allow a perfect and harmonic integration human-machine, but may also suggest a fundamental threat for employability.

In the digital context, on contrary to what the conventional employability model offers, individuals tend to be entrepreneurs of their own careers, becoming increasingly independent and disconnected from the companies they work for.

According to the concept of employability used in this study, the key point among workers, employable or not, is the level of aptitude to perform a certain activity. At this moment, it is important to point out that the

concept of employability has much broader dimensions, considering macroeconomic and political aspects and the dynamics of the labor market.

For this reason, to meet the specificity proposed by the present study, which is to verify the impact of the digital revolution on people's employability, especially considering the performance of AI, the concept of employability is limited to the dimension of the competencies of the worker.

## **2 EMPLOYABILITY FROM A NEW PERSPECTIVE**

Work, with all its relevance to humankind, during many years acted as a dignifying factor, a way of subsistence and an element for social insertion. However, giving the current advancements of technology, work should be discussed and studied in a new configuration. This new configuration considers work from the perspective of individual's employability (Souza, & Pinto, 2017).

According to Campos (2003), the origin of the word "employability" is a combination of the words: employment and ability, respectively. In principle, this concept came up in 1910 in the United States, with great repercussions in Europe. At that time, it was a "dichotomous employability", which distinguished individuals able to work by their physical and mental conditions from those who were disabled. Until then, there was no middle ground between the conditions of being employable or non-employable. This conceptual dichotomy of employability lasted until the middle of the 20th century, when more modern versions emerged transposing the Anglo-Saxon frontiers.

But it was in 1950, in Europe, that this word was used in some publications, referring to people unassisted in the labour market. From then on, a debate began about employability about the ability of the institutions to offer jobs, in response to the high unemployment rate.

At the end of the 70's, there was a considerable number of people with incredibly low conditions of reintegration into the labor market. In the 80's, the new understanding of employability was linked to a new theory: human capital (Schultz, 1961). This theory was originated from the capital market one, which hampered the reintegration of workers, demanding significant efforts from schools, companies and government.

Therefore, in the subjective perspective, the concept of employability is associated with the skills a worker will gather to become employable, which does not guarantee him/her to be employed; despite the fact that the worker can obtain skills that make him/her more valuable to the market, there are other dimensions associated with employability, such as aspects of macroeconomics, public policies and capitalism itself, that contribute to this issue.

However, the characteristics of current society and its effects on employability gave the concept a new perspective. Different from the old notions of employability of industrial society, nowadays, it has contemplated substantial contemporary transformations, due to the current dynamics of society and technological changes.

### **2.1 AI and its effects on contemporary employability**

Regarding to modern technologies, AI presents itself in the edge of science and human intelligence. According to McCarthy (2002, as cited in Sellitto, 2002) and Arariboia (1988, as cited in Sellitto, 2002), artificial intelligence is the science and technology of building intelligent machines, especially computer programs. It is related to the use of computers for the understanding and exploration of human intelligence, not limited, however, to biologically observable methods. Furthermore, artificial intelligence techniques seek to imitate mechanisms of nature through technological structures, in which development was based on natural devices.

Therefore, AI has a peculiar characteristic in terms of the ability to absorb professional skills, as it performs repetitive and even the most sophisticated tasks of the human mind, previously unimaginable for a machine. In this sense, although AI offers enormous potential for adding value and consequent competitive advantage, the counterpart is manifested in the challenges of integrating various technologies developed by AI in the corporate business model and, at the same time, to manage risks (Plastino, & Purdy, 2018, as cited in Corrêa, & Careta, 2019).

Also, AI integrates the fourth industrial revolution beyond boundaries of human imagination, as part of modern technologies such as weapons, drones, nanotechnologies, neurotechnologies and digital systems.

The expectation, according to scholars, is that AI shall be a networked intelligence, and will no longer be tied to a specific machine. For Teixeira (2019), intelligence itself will be a commodity functioning as a flow of data offered by companies, such as telephony and electricity services.

Since the contributions of AI go beyond merely repetitive activities, reaching to perform functions that require intelligence, the present study draws attention to the performance of AI and its impact on employability. Will AI be able to absorb human tasks in a way that might affect people's employability?

A clear example of this is an AI-based software, which works in the field of law, through the combination of available information and analysis of the financial contracts of North American banks. According to Felipe et al (2018), this new software could replace 360 thousand hours a year of a lawyer.

This ability to assimilate sophisticated and complex professional skills, generates great concerns on the labour market in near future and attention to its impact on many different areas of knowledge, in greater or lesser degree (Cardin, 2021; Lino, & Rousy, 2006).

In this way, many scholars and specialists in AI have argued in favor of the possibility of machines to perform professional tasks, to learn and generate new knowledges and even perceive emotions and to interact with human beings.

Therefore, the effectiveness of the machine, when performing professional activities that require interactions and understanding of human beings, in addition to the simple arithmetic logic, suggests a future with greater participation of machines in most of the areas which were exclusively dominated by human beings, such as the labor market.

## CONCLUSION

In view of the evidence presented in the literature, it is reasonable to say that the term “employability” is being redesigned according to the new demands of the digital world. In a near future, the labour market and jobs shall be reformulated, as modern technologies based on AI are absorbed.

The current and challenging technological age, marked by growth and the creation of new kind of jobs, can be seen with enthusiasm by some, but not for all. Others have seen it as a threat instead of an opportunity. The absorption of professional skills by the prominent level of performance of AI might be seen as a trend of a big wave of unemployment, together with the disaggregation between the increase of wealth towards the evolution of employment, in great part, caused by the digital revolution.

As seen in this paper, while AI absorbs and performs increasingly sophisticated activities, it also confirms and fosters the logic of economic rationality, in which employees are seen as costs.

These costs are reflected in various aspects, such as: legal labour and tax obligations, as well as other aspects related to absenteeism, labour turn over, labor rest, productivity, and other labor rights, economically relevant, which imply in expenditures for the employers.

In the case of the effectiveness of professional deliveries carried out by machines based on AI systems, it is noticed an optimization of processes which leads to cost savings, considering that machines do not complain and do not have fatigue.

It seems that, according to the contribution of several studies in the revised literary (Artur, & Rousseau, 1996), the impact generated by the digital revolution on employability is already a reality and tends to grow increasingly as innovative technologies are coming up.

According to Kovács (2016), post-employment theorists have bet on the inevitable disappearance of jobs as human activities, due to the technological changes and others related to new production models and management processes.

With the high performance, excellence and low cost, there is an enormous potential for AI to absorb a great part of human professional skills and competences in various areas. It is increasingly presumable that the digital revolution comes to replace some jobs and deeply affect the labor market as it is today. The outcomes of this revolutionary transformation depend on how the gains are distributed as it is already perceived a deterioration of inequalities in the labour market.

This paper expects to contribute for the reflection on how society, companies, governments, and professionals in general must deal with this new digital age in a way that this coming system might be more socially fair (Antunes, 2015), environmentally responsible and economically prosperous.

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