

Artificial intelligence: Its impact on employability

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Abstract

Artificial Intelligence (AI) has had a significant impact on employment worldwide. While AI has the potential to automate repetitive tasks and improve efficiency and accuracy in many areas, it is also true that many jobs can be replaced by intelligent machines and algorithms. This can lead to job losses in some areas but can also create new employment opportunities in technology and AI-related sectors, such as software development and data engineering. A qualitative approach developed through bibliographic research was adopted in this study. The overall objective of this study is to examine the impacts of artificial intelligence on employment. The study demonstrated the relationship of the Compensation Theory with the labor market, where it is possible to identify a movement of worker adaptation to new technologies, as, once again in history, revolution demands an evolution in the way of working and in the skills of each individual. These skills are necessary to maintain employability and professional relevance in an increasingly competitive environment. In addition, the study highlights that the topic requires discussions around the regulation of the limits of new technologies in the corporate environment and beyond.

Keywords: Artificial Intelligence; Employment; Compensation Theory; Industry 4.0.

1. Introduction

The present study addresses a current and relevant topic that demands ongoing debates regarding the impacts that AI can and will generate on employability. These debates will have repercussions in society as a whole, generating reflections on politics, ethics, and the necessary security in the individual versus machine relationship.

The rapid advancement of Artificial Intelligence in corporate and societal contexts has been observed, and despite its negative and positive aspects, it is urgent to build bridges where everyone can benefit. A qualitative approach was adopted and developed through the characteristic research procedure of a literature review.

The general objective of this study is to examine the impacts of artificial intelligence on employability. The specific objectives of this research are as follows: to comment on the fourth industrial revolution, to discuss the impacts of artificial intelligence, and to address the relationship between the theory of compensation and the job market.

This article is organized into four sections. The first section is the introduction, highlighting the objectives of this research. The second section presents a theoretical foundation developed through a literature review, incorporating the opinions of various authors who have addressed the researched topic. The third section presents the methodology adopted for the research development, and finally, the fourth section presents the concluding remarks.

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2. Material and methods

Scientific methodology, according to Prodanov (2006, p.17), "advocates a series of rules through which knowledge must be developed [1]."

Regarding the approach to the problem, the research is characterized as qualitative, which, according to Denzin and Lincoln (2000, p.01), "involves an interpretative and naturalistic approach to its study objective [2]."

The qualitative approach allowed for a quick interpretation of the study objective through clear and concise concepts, thus expanding the potential avenues for future debates on the topic. Qualitative research differs in its ability to represent the views and perspectives of the study [...]. It encompasses the contextual conditions - social, institutional, and environmental - in which people's lives unfold. In many aspects, these contextual conditions can greatly influence all human events [3].

As a research procedure for the elaboration of this article, a literature review was conducted, utilizing available materials derived from previous studies published in books, articles, and news items, among others, aiming to construct a fresh perspective on the topics discussed and provide an additional source that will foster future analyses.

Vergara (2000) emphasized that bibliographic research is a systematic study developed based on material published in books, magazines, newspapers, and electronic networks. It provides an analytical tool for any other type of research [4].

In this regard, the article qualitatively approached the researched sources, highlighting the contributions of the following authors: Schultz (1987), Schwab (2016), Gagné and Deci (2018), Teles and Caldas (2019), Ferreira and Ferreira (2021), and Xavier, Neto, and Gomes (2021).

3. Literature Review

This theoretical foundation has been organized into three topics. The first topic addressed the 4th Industrial Revolution and its constituent factors, with Artificial Intelligence being among these factors. In a subsequent section, the potential impacts of this new technology, Artificial Intelligence, on employment were discussed. Finally, the third topic focused on analyzing the Theory of Compensation and its moderating effect on the impact of Artificial Intelligence on employment.

3.1. The Fourth Industrial Revolution

Following the trend of previous revolutions, the "4th Industrial Revolution" or "Industry 4.0" is expected to have significant economic and social impacts. However, it differs from previous revolutions in its main characteristic, which is the speed of its changes.

Another characteristic of this revolution is its breadth, as it has a worldwide and profound reach, transforming the way people interact and, most importantly, relate to each other.

Khan and Turowski (2016b) describe it as a revolution enabled by the widespread application of advanced technologies at the production level to bring new values and services to customers and to the organization itself [5].

Connected systems will interact through the Internet and be capable of analyzing data, predicting errors, configuring themselves, and adapting to changes [6]; [7]; [8]; [9].

Through Industry 4.0, it will be possible to analyze data between machines, enabling faster, more flexible, and more intensive processes. In this sense, this revolution is characterized by the integration of artificial intelligence in areas such as nanotechnology, biotechnology, materials science, energy storage, quantum computing, and algorithms capable of identifying cultural needs and interests [8].

Contextualizing this revolution in the labor sphere, a 2018 report by the World Economic Forum pointed out that artificial intelligence is one of the four factors driving work transformation, along with mobile connectivity, massive data collection, and cloud computing.

Although studies on Industry 4.0 date back to 2011 in Germany, its exponential advancement has been observed after the 2020 pandemic, making artificial intelligence even more present in business solutions and communication.

3.2. Impacts of Artificial Intelligence

There are two progressive streams regarding Artificial Intelligence (AI): the literature on services and technologies tends to focus on the positive aspects of its performance, while the economic literature concentrates on the effects of AI on jobs [10].

Ferreira and Ferreira (2021, p. 23) define artificial intelligence as "the set of algorithms and techniques that allow machines to learn from data and experiences, as well as the ability to perform tasks that previously required human intelligence to be accomplished [11]."

According to Schultz (1987), economists argue that people are intimately related to the production of a nation's wealth, as it is measured by the contribution of individuals' labor to production. The author adds that humans are currently much more valuable than all other forms of wealth combined [12].

This view from Schultz (1987) has become less relevant as organizations adopting Industry 4.0 seek to maximize wealth and profitability through the use of AI, increasingly reducing the relevance of human labor contribution, at least in terms of routine and less specialized jobs [12].

In this sense, the major challenge is that "the future of these economies depends on their ability to transform knowledge progress into innovative ideas that generate new businesses and new jobs [13]."

While this equation is not resolved, another question arises regarding the impact that AI will have on individuals' employability: what skills should be developed to confront these new technologies?

According to Gonçalves, Júnior, and Duarte (2021, p. 20), "employability can be understood as the individual's ability to enter and remain in the job market through the development of technical and behavioral competencies, as well as adaptation to market changes and demands [14]."

Thus, the underlying principle of this approach is based on the complementarity between capital (i.e., technology) and knowledge, assuming that the increasing demand for skilled workers is driven by new technologies adopted by advanced industries, in which only workers with higher levels of skills can operate [15]; [16].

In this sense, maintaining employability in the face of technological innovations becomes daunting when, according to a 2018 World Economic Forum report, skill stability is expected to be around 58% in 2022, with another 42% requiring requalification [17].

In total, 54% of workers are expected to develop new skills, with 35% requiring a minimum of six months of training, 9% between six and twelve months, and 10% over one year. "The importance of skills such as technological design and programming highlights the demand for different types of technological competencies," the document points out [17].

According to a June 2019 report by McKinsey, a balance in job losses and gains is estimated until 2030, with losses and gains both amounting to 20%, with slight variations. However, if the nominal difference remains unchanged, the changes are expected to be significant. Between 40 and 160 million women and between 60 and 275 million men may have to change occupations [17].

In this equation to adapt to the new automated job market, workers who lack resources to update themselves, as well as those who did not have the opportunity to acquire basic educational qualifications, are not taken into account. These individuals, who previously performed repetitive tasks, will be even further marginalized from the job market.

It is in this context that a group of over a thousand people, including Twitter CEO Elon Musk and organizations associated with the technology field, recently signed a letter recommending that any and all research involving AI be paused or even discontinued [18].

According to César (2023, p. 01), AI has a "[...] potential negative impact on the flow of disinformation and also on the job market [18]."

The problem is that there will always be lingering doubts: Will all research really stop? Are the issues already being studied, and are actions being taken to address these negative impacts? Will pausing or discontinuing research related to AI not result in a major setback for the scientific community?

These are relevant doubts because depending on the answers, if they arise at all, the prospects created by AI for the job market could lead to a future where humans are gradually replaced by intelligent mechanisms, and as a result, humans will transition to new professions that require better training in each area within the job market. This situation will require another wave of significant investment in the technological field and, hopefully, improvements in people's quality of life.

3.3. The Relationship of the Compensation Theory with the Job Market

The Compensation Theory has important implications for the job market. According to this theory, individuals can compensate for the lack of specific skills by developing other skills or characteristics, which can increase their employability and improve their career prospects.

The Compensation Theory is also related to the idea that intelligence can be seen as a set of interconnected cognitive skills, and that people with different sets of cognitive skills can be equally intelligent. Xavier, Neto, and Gomes (2021, p. 09) state that "intelligence is composed of a set of cognitive skills, such as logical reasoning, problem-solving, memory, language, perception, attention, creativity, and socio-emotional skills [19]."

This approach suggests that instead of assessing a person's intelligence based on a single skill or characteristic, it is necessary to consider a range of different cognitive skills.

This way of thinking is consistent with the idea that the job market values not only specific technical skills but also socio-emotional skills, such as teamwork, communication, and leadership.

According to the Compensation Theory, individuals who possess these socioemotional skills can compensate for the lack of specific technical skills, making themselves more attractive to employers.

According to Gagné and Deci (2018, p. 408),

The Compensation Theory suggests that individuals can compensate for the lack of specific technical skills by developing other skills and characteristics, such as socioemotional skills like motivation, creativity, perseverance, initiative, and resilience. These skills can make individuals more attractive to employers and can increase their employability.

Furthermore, the Compensation Theory suggests that individuals can adapt to changes in the job market by developing new skills to fit new opportunities and requirements.

This approach is consistent with the idea that education and lifelong learning are important for employability and adaptation to changes in the job market.

In this context, the Compensation Theory is among the key characteristics of the Industry 4.0, as it is not only the technologies and machines that are evolving but also human beings.

It should be emphasized that for a long time, humans have adapted to technologies, but soon technologies will need to adapt to humans as they reclaim the skills inherent to their essence and create new professions that prioritize these skills, such as holistic therapies.

4. Conclusion

The research fully met the proposed objectives by providing a comprehensive context of the Fourth Industrial Revolution, highlighting its key characteristics, and emphasizing the pivotal role of Artificial Intelligence (AI) in driving rapid changes in work relationships.

In this regard, it was possible to expound on the relevance of AI for the construction and consolidation of Industry 4.0, as well as the profound impacts on employability resulting from the widespread adoption of this new technology.

The study illuminated the relationship between the Theory of Compensation and the labor market, where a noticeable movement of workers adapting to new technologies can be identified. Once again, history shows that revolutions necessitate evolution in both work processes and individual skills. These skills are essential to maintain employability and professional relevance in an increasingly competitive environment.

However, the article prompts reflection on the fairness of this competition: humans versus machines that process infinite amounts of data within seconds. Can this equation be balanced?

This questioning becomes more concerning when we fail to address the existing inequalities in labor relations, which still bear resemblance to slave-like conditions even in the 21st century. The challenges of the Fourth Industrial Revolution coexist with those of the First Revolution.

Finally, although the primary objective of the article was to analyze the impacts of Artificial Intelligence on employability, the discussions about the rapid changes in this technology transcend the labor aspect. These debates encompass potential risks to society and even civilization, manifesting in economic, political, and ethical issues. This is echoed by the publication of a letter from the non-profit Future of Life Institute, which called for a delay in the development of AI platforms to establish formal security protocols.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors assure that there is no conflict of interest with the publication of the manuscript or an institution or product mentioned in the manuscript and/or important for the result of the presented study.

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