

REPLACEMENT OF JOBS WITH ARTIFICIAL INTELLIGENCE

NAHRAZENÍ PRACOVNÍCH MÍST UMĚLOU INTELIGENCÍ

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Abstract: *Artificial intelligence is one of the most discussed topics of our time. One of the questions that arises in connection with artificial intelligence is whether artificial intelligence can replace human capital. This article aims to provide an up-to-date and complete theoretical overview of artificial intelligence in replacing human capital and to create a detailed basis for further research in this area. The first part of the article is dedicated to introducing artificial intelligence technology and presenting the advantages and disadvantages of its use. Next, machine learning and RPA, closely related to artificial intelligence technologies, are introduced. The last part of the article examines the impact of artificial intelligence on replacing human capital.*

Keywords: artificial intelligence, RPA, machine learning, job replacement

JEL Classification: O15, O31

Introduction

Artificial intelligence is one of the most important technological trends of our time. Artificial intelligence technologies are a broad category of computer techniques that allow machines to perform tasks that typically require human intelligence. (Trivedi et al., 2023) With the development of this technology, a fundamental question arises: Can artificial intelligence replace human work, or does it serve only as a tool to make it more efficient? Some view artificial intelligence as an assistant that helps them streamline and speed up work processes. Others see artificial intelligence as competition that can replace them in their jobs.

Due to the dynamic development and growing influence of artificial intelligence on the labor market, it is essential to analyze the aspects of this technology and its economic, social, and ethical consequences. While some studies point to positive impacts of AI, such as increased productivity, reduced operating costs, or improved decision-making processes, others warn of potentially negative consequences, including unemployment. Artificial intelligence thus interferes with job roles and the future of interpersonal cooperation in the workplace.

This article aims to provide an up-to-date and complete theoretical overview of replacing human capital with artificial intelligence and to create a detailed basis for further research in this area. First, the article will define AI and its specific advantages and disadvantages. Next, key technologies such as machine learning and robotic process automation, which are related to artificial intelligence and are used to automate routine tasks, will be introduced. In the final

part, the article will address whether AI can truly replace human capital or whether its role is more supportive, for example, in assistance.

1 METODOLOGY

This work will use a qualitative research strategy, specifically the literature review method, which will allow obtaining theoretical knowledge about the issue of artificial intelligence and its impact on jobs. In the first phase, a systematic review of professional literature will be conducted, focused on defining the term artificial intelligence and mapping the current state of this technology. Emphasis will be placed on academic sources, scientific articles, and professional publications. Based on this research, the advantages and disadvantages of using artificial intelligence will be analyzed, with special attention to its application in the work environment. The article will address whether artificial intelligence can replace human labor, i.e., whether there are job positions that are easily automated due to their nature, and vice versa, positions that are irreplaceable from the point of view of current technological development.

The research is structured based on the following research questions that define the direction of article:

RQ1: What advantages and disadvantages does artificial intelligence bring?

RQ2: Can artificial intelligence replace jobs performed by humans?

Websites dealing with the topic and scientific databases such as Scopus, Web of Science, and Google Scholar will be used to search for relevant literature. The selection will include scientific articles, professional books, research reports, and professional articles. The knowledge obtained will then be subjected to thematic analyses, followed by a comprehensive and structured theoretical overview that will understand the issue of artificial intelligence's impact on the labor market from a broader socio-economic perspective.

The main objective of the work follows from the set research questions. This article aims to provide a current and complete theoretical overview of replacing human capital with artificial intelligence and to create a detailed basis for further research in this area.

2 ARTIFICIAL INTELLIGENCE AND ITS ADVANTAGES AND DISADVANTAGES

Artificial intelligence is a system that expresses intelligent behavior. Artificial intelligence, robotics, and automation are the first significant substitutes for human knowledge. (Matthews, 2020) Artificial Intelligence is the simulation of human intelligence in machines programmed to think and act like humans. (Yan-ping & Ai-qin, 2022) Artificial intelligence refers to the ability of computer programs and robots to imitate human intelligence. This ability to mimic human intelligence mainly refers to cognitive functions, such as learning from experience or understanding natural languages and solving problems. (Jagare, 2022) Artificial intelligence is a term used to describe the automation of intellectual tasks. (Ashenden, 2021) Artificial intelligence can be used to analyze financial data, for example, to reduce the need for accountants in bookkeeping. (Novak, 2023) In recent years, artificial intelligence has become the productivity of the future society. (Yan-ping & Ai-qin, 2022) Artificial intelligence aims for computing systems to mimic human intelligence to such an extent that AI-powered devices can perform work with little or no human intervention (Talaviya et al., 2020).

As artificial intelligence grows in its ability to mimic human cognitive functions and autonomously perform complex tasks, fundamental questions about ethics, safety, and responsibility arise. As artificial intelligence moves beyond being a tool and begins to make decisions with a potential impact on human lives, it becomes necessary to set clear frameworks for its use. These frameworks must reflect the systems' technical capabilities and, above all, the protection of human rights and safety. In this context, the Three Laws of Robotics have been established.

- The robot must not harm a person or allow it to be harmed by its inaction.
- The robot must obey a human's commands, except when those commands conflict with the first law.
- The robot must protect itself from harm, except when this protection conflicts with the first or second law.

All these laws are based on the premise that a robot must never harm a human. (Stedron, 2020)

One of the most common questions is whether artificial intelligence will take over the world. For the most part, the public perceives artificial intelligence in a very distorted way, mainly due to the representation of this issue in science fiction. Since 2014, Elon Musk, the owner of Tesla, has repeatedly pointed out the possible threats that artificial intelligence can pose to humanity. Bill Gates and Stephen Hawking, for example, express themselves similarly. The opposite approach is taken by the social network founder of Facebook, Mark Zuckerberg, who is enthusiastically developing his own robotic personal assistant. (Sainato, 2015)

However, robots still do not have intuition, empathy, or emotional intelligence; according to some scientists, we are not even close to what people fear. It is necessary to gain the public's trust; products must be created within a strictly defined ethical framework at the design stage. Issues such as data privacy protection, abuse of artificial intelligence, the moral standing of artificial intelligence systems, or liability when something goes wrong need to be addressed. (Štědroň, 2020)

Artificial intelligence has made tremendous progress in recent years and has the potential to revolutionize many industries. AI is improving people's economic lives but also creating problems such as unemployment. (Yan-ping & Ai-qin, 2022) HR surveys show deep concern among the workforce about automation and how this technological trend could affect the job market and productivity (Pew Research Center, 2017).

The benefits of artificial intelligence applications and their tools are enormous and can streamline many processes. The first advantage is that they are available nonstop. The average person works 6-8 hours a day. Artificial intelligence has a unique ability to work without a break. This advantage can be helpful in hospitals, help centers, online shopping companies, etc. The second advantage is that artificial intelligence can perform tasks faster and more accurately than humans. Humans make mistakes, but computers do not make mistakes if they are correctly programmed. Artificial intelligence makes its decisions based on previous information and using algorithms. Thanks to this, it can help you make accurate decisions. Another advantage of artificial intelligence is that it takes risks and thus increases human safety. Artificial intelligence takes risks instead of humans in dangerous environments where humans are not safe, such as nuclear power plants, coal and oil mining, bomb disposal, exploration of the deepest oceans, and space or Mars exploration. Another advantage is that AI helps improve the customer experience with the company. Many organizations and companies use digital assistants to interact with customers pro, video information, and resolve their queries. A considerable advantage is the help of AI in repetitive tasks. This increases productivity, because when performing repetitive tasks, a person gets bored and loses

productivity. AI can handle and perform repetitive work, which allows a person to focus on more creative, complex, and efficient work.

With many bright sides, AI also has some disadvantages. Due to AI, some employees are losing their jobs. Most companies try replacing minimally qualified employees with AI robots to perform most repetitive tasks. Another disadvantage is the high cost of creating and maintaining AI. The development and implementation of AI are expensive and may not be affordable for some organizations. Another disadvantage of artificial intelligence is the increasing dependence on technology. We lose some of our skills as we become more dependent on artificial intelligence. For example, problem-solving and critical thinking skills. Another disadvantage of artificial intelligence is that it has no emotions. -Team leadership is a fundamental skill that only humans can demonstrate because artificial intelligence cannot feel empathy or understand the emotional states of others. (Trivedi et al., 2023)

From the literature review, the answer to research question RQ1 (RQ1: What advantages and disadvantages does artificial intelligence bring?) The advantages and disadvantages of use artificial intelligence have been compiled into Table 1 for better clarity.

Table 1: Advantages and disadvantages of using artificial intelligence

Advantages	Disadvantages
can facilitate access to information education	spreading misinformation and manipulating the public
can improve health care	the privacy and security of personal data may be breached
can bring about safer cars	
can increase workplace safety	replacement of some jobs
can offer new job opportunities	more likely to increase human laziness
can help with optimization and flow of sales	lacking out of bow thinking
can improve machine maintenance in businesses	expensive to implement
can increase performance and production quality	lacks creativeness and can not understand emotions
can increase the level of customer service, accuracy and speed	difficult to implement ethics and significant environmental damage due to intensive energy use

Source: own processing according to Madhugiri (2023)

3 MACHINE LEARNING AND ROBOTIC PROCESS AUTOMATION

With the rapid advances in artificial intelligence technology, more job tasks are increasingly automated by artificial intelligence (Smith & Anderson, 2014). Artificial Intelligence technologies are a broad category of computer science techniques that enable machines to perform tasks usually requiring human intelligence, such as understanding natural language, recognizing images, making decisions, and solving problems. (Trivedi et al., 2023) The artificial Intelligence system can be divided into two components. One component is machine learning, and the other is robotic process automation, as you can see in Figure 1.

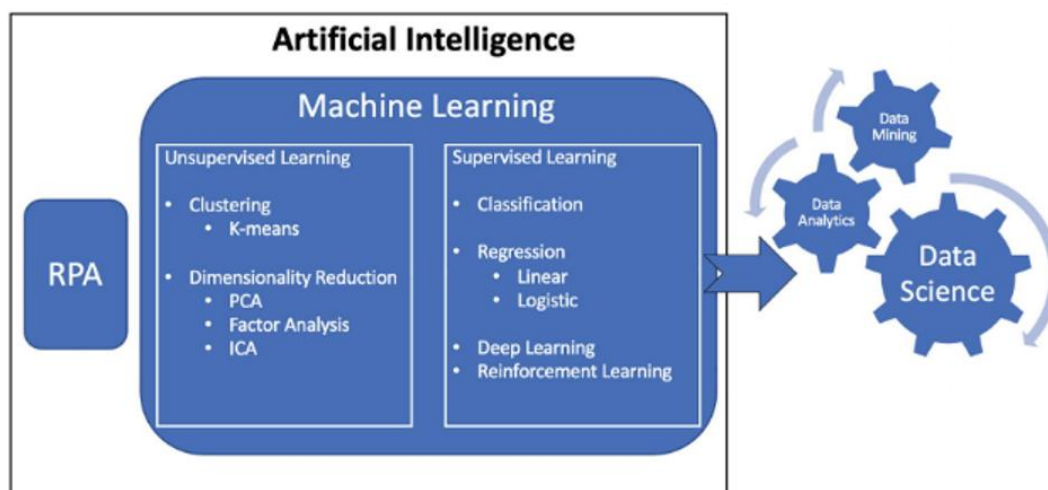


Figure 1: The relationship between AI, RPA and machine learning

Source: Sekar, 2022

3.1 Machine learning

Machine learning is a subset of artificial intelligence specializing in computer systems to perform specific tasks. Machine learning is based on neural networks. These are based on the simulation of connected neural units, which represent how neurons in the brain interact. (Hurbans, 2020) Artificial intelligence systems can use machine learning to make decisions or optimize processes through historical data. (Hurbans, 2020) Machine learning can be defined as the application of computer algorithms to create a mathematical model that is based on sample data. Machine learning algorithms are used in a large number of applications. (Jagare, 2022).

Machine learning involves two techniques. These techniques are unsupervised learning and supervised learning. Unsupervised learning is unsupervised and primarily consists of machine learning techniques. Supervised learning includes machine learning algorithms such as classification, regression, and deep learning. Robotic processes are automated using specialized tools or scripting languages. (Sekar, 2022)

3.2 RPA

Microsoft published an article remarking that an RPA tool is software for defining workflows and configuring bots to perform specified tasks logically. (Microsoft, 2023) Lowe et al. (2021) argue that RPA is a business process automation technology based on software robots. According to Mahey (2020), the role of RPA is the automation of human-computer activities.

These activities are high-volume, repetitive, and lengthy, draining employees' joy of work. Brooks (2020) explains that RPA enables businesses to engage in activities and projects that are more inspiring than routine tasks. According to Kršková (2020), RPA represents software robots. These robots appear in digital form as programs, so they are not physical machines. With the help of these software robots, individual actions are simulated on the computer as if they were performed physically by a person.

4 AI'S IMPACT ON JOBS

Some employees in various professions are concerned about implementing AI and its components. These employees perceive AI as a competition that may soon replace them. In contrast, other employees perceive AI as an assistant that helps them with many of the routine

tasks they have to solve in their profession. According to the American investment bank Goldman Sachs, artificial intelligence can replace up to 300 million jobs worldwide. (Fišer, 2024) In advanced economies, AI will affect approximately 60% of employment. In half of these cases, it will lead to an increase in labor productivity. In other cases, AI will be able to perform critical tasks currently performed by humans. This could reduce the demand for labor, affect wages, and even lead to the disappearance of some jobs. (Georgieva, 2024)

AI will affect about 26% of jobs in low-income countries and about 40% of employment in emerging markets. States such as India or Brazil are considered developing markets, while low-income countries most often include African countries such as Burundi or Sierra Leone. (Georgieva, 2024) Most low-income countries and emerging markets need the infrastructure or skilled workforce to use AI. This raises the risk that this technology could worsen inequality between nations over time. (Georgieva, 2024) There may also be a situation where the wages of higher-income and younger workers will increase disproportionately due to the introduction of AI. On the contrary, those workers with lower incomes and older employees would resent them. (Fišer, 2024) Figure 2 below shows how most jobs are affected by AI in advanced economies, with a smaller share in emerging markets and low-income countries.

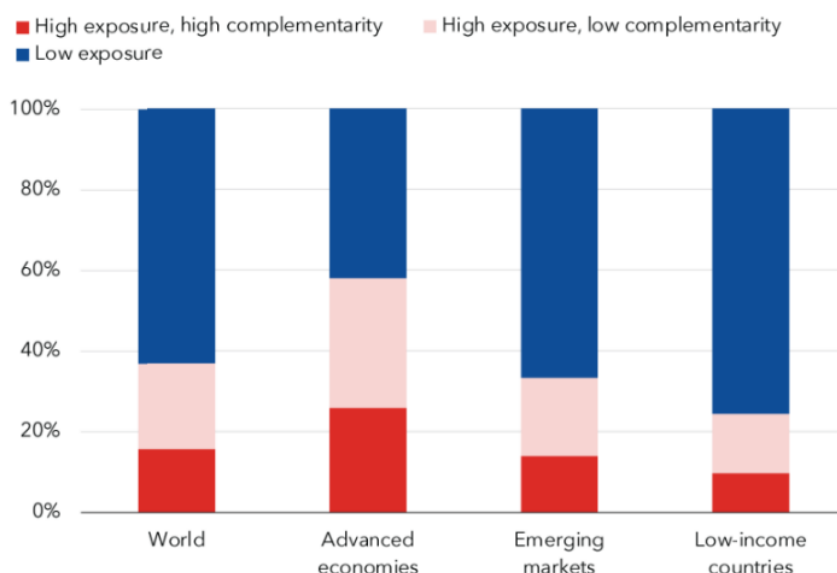


Figure 2: Employment shares by AI exposure and complementarity

Source: Georgieva, 2024

However, many jobs are likely to be replaced by machines and robots, especially in areas such as manufacturing and services. For example, robots are already used in the automotive industry to assemble cars. Another field that is likely to be partially affected by AI is law. For example, algorithms and machine learning can be used in document processing and legal research. Furthermore, in medicine, algorithms can be used for diagnosis. However, the final decision will still depend on the doctors. Systems like ChatGPT could replace, for example, journalists, as they allow the creation of essays and articles. Journalists will thus face more competition. (Vallance, 2023)

Many companies have already used AI to automate processes, but those that use it primarily to displace employees will only see short-term productivity gains. Wilson & Daugherty (2018) conducted a study that included 1,500 companies. The authors found that companies achieve the most significant performance improvements when humans and machines work together. Through collaboration, humans and AI enhance each other's strengths, leadership skills, teamwork, and creativity. Research by Ghosh & Sadeghian (2024)

shows that with the introduction of AI into the work process, overall job satisfaction is higher, job decency is significantly improved, and job meaning remains the same.

On the one hand, there are jobs in the labor market where simple tasks are performed that can be automated. This makes it possible to save costs and increase production efficiency. Thanks to this, these employees could then lose their jobs. On the other hand, in some job positions where complex tasks are performed, automation of simpler tasks can help the worker perform his tasks faster and thus increase work productivity. Artificial intelligence can be his assistant/helper. In some fields, human work is simply irreplaceable. The research conducted by Chan & Tsi (2023) found that most participants claim that human teachers have unique qualities such as critical thinking, creativity, and emotions that make them irreplaceable. The research also highlights that the human factor in teaching includes socio-emotional competencies that AI technology lacks. Montemayor et al. (2022) argue that there are fundamental barriers to applying AI in clinical medicine and care, where empathy is essential. Despite these concerns, it is worth noting that AI can also create new jobs. As AI becomes more widespread, humans must design, develop, and maintain the technology. In addition, humans will be required to interpret and analyze the data generated by AI systems and to develop strategies for using this data effectively. These new jobs will require specialized skills and knowledge and may be better paid than the jobs that AI replaces.

A literature review found the answer to research question RQ2 (RQ2: Can artificial intelligence replace jobs performed by humans?). Ultimately, the answer to whether or not AI should replace human jobs will depend on several factors. These factors include the nature of the job and whether empathy is essential, for example, in education or some help centers, which require the expression of feelings and empathy, which AI cannot perform. It also depends on the nature of the specific tasks and their routineness and simplicity. (Trivedi et al., 2023)

In the case of a job where an employee performs simple, repetitive tasks, this employee will likely be replaced by artificial intelligence; however, if the employee's main activity is complex tasks that are accompanied by some routine tasks. Artificial intelligence can help this employee from routine tasks so that he can fully devote himself to more complex ones that require more critical thinking and professional decision-making skills. Instead of completely replacing a person, artificial intelligence can serve as support that will facilitate and accelerate the implementation of more complex activities. In many professions, there is a shift where a person stops performing routine tasks. Such a development can lead not only to increased efficiency but also to greater employee satisfaction. If the work requires empathy, sensitivity expression, and perception of feelings, this job position is irreplaceable for human workers. With the implementation of artificial intelligence into the work process, it is necessary to consider new job opportunities that arise with the development of artificial intelligence. Companies will need experts to develop, manage, and maintain AI systems. Companies will also need specialists who can interpret and work with the results of these systems. This places new demands on the qualifications of the workforce and, at the same time, puts pressure on the education system.

DISCUSSION

In the labor market, there is the potential for AI to replace human workers in performing tasks that are simple or repetitive. (Alfieri et al., 2024) Many tasks currently performed by humans, especially those that are repetitive, could be automated using artificial intelligence. This allows people to focus on more complex and creative tasks and be more productive. This could lead to significant job losses. (Huang & Rust, 2018) According to Chandran et al. (2021), the more tasks AI can replace, the less unskilled labor there will be.

On the other hand, AI can already replace humans in even the most advanced tasks (Huang, Rust, and Maksimovic 2019). With AI's increasing capabilities, most tasks that humans would otherwise perform will likely be performed better and more efficiently by AI, so AI may eventually become a significant constraint on human labor (Fast & Horvitz, 2017).

Whether AI will truly replace human labor is a complex issue that raises ethical and social concerns. On the one hand, it is undeniable that AI has the potential to improve efficiency and productivity in many areas significantly. For example, in manufacturing, AI can perform tasks faster and more accurately than humans, leading to increased performance and lower costs. In fields such as medicine and finance, AI can analyze vast amounts of data to make more accurate predictions and diagnoses. (Huang et al., 2019)

However, there are still jobs where one must be influenced by another person. These jobs require working with feelings and empathy, for example, in education and psychology.

Jobs at the administrative level and in production will all be completely automated in the future. Accountants, managers, economists, and officials will use artificial intelligence as an assistant to perform simple tasks that can be automated. This will allow them to focus on the more complex parts of the task and thus complete the task faster.

Some positions, such as doctor, nurse, teacher, psychologist, social worker, and others that require empathy and work with people's feelings, cannot currently be replaced by artificial intelligence. The question arises whether artificial intelligence can reach a level where it can work with feelings and empathy and make decisions like a human. Another question is how this would impact people and what the world would look like then.

It will be important for governments, businesses, and individuals to carefully consider all factors as AI continues to evolve (Trivedi et al., 2023).

CONCLUSION

Automation could streamline work processes and increase productivity. Based on this article, there is a discussion about the possibility that artificial intelligence could replace some employees who perform relatively simple or repetitive tasks. According to Trivedi et al. (2023), this could lead to job loss and unemployment for some individuals, negatively affecting society. Wang et al. (2023) found in their research that 54% of jobs in China are at high risk of substitution.

On the other hand, some confirm that human work is simply irreplaceable in some fields. The research conducted by Chan & Tsi (2023) found that most participants claim that human teachers have unique qualities such as critical thinking, creativity, and emotions that make them irreplaceable. The research also highlights that the human factor in teaching includes socio-emotional competencies that AI technology lacks. Montemayor et al. (2022) argue that there are fundamental barriers to applying AI in clinical medicine and care, where empathy is important.

In conclusion, AI has the potential to improve efficiency and productivity in many areas significantly, but it also raises concerns about replacing human workers. It is important to carefully consider these issues as AI becomes increasingly prevalent in the workplace and to take steps to mitigate any negative consequences. This may include training programs to help people acquire new skills, policies to ensure that AI is used ethically and transparently, and measures to support those who may be adversely affected by the adoption of AI. Ultimately, the decision to use AI to replace human jobs should be based on a careful balance of potential benefits and disadvantages. This article has provided an overview of the current state of AI and the replacement of human capital in employment and has offered a basis for further discussion and research.

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