

Human Resources in the Age of Artificial Intelligence

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Abstract

This study seeks to shed light on the future of human resources in light of organisations adopting artificial intelligence and its most important technologies in the field of human resource management. It also considers the contributions at organisational and human resource levels.

The study also highlights the challenges that human resources will face due to the changes that this technology will bring about, as well as the automation of most of the organisation's activities. This will lead to some jobs disappearing and others changing.

Therefore, it is necessary to retrain human resources, equipping them with the new skills and experiences needed to keep pace with current changes. At the same time, however, this technology will create new job opportunities based mainly on creativity and innovation, particularly in the field of artificial intelligence.

Keywords: artificial intelligence, human resources, human resource management, organisation.

Introduction:

Human resources are one of the most important and valuable pillars of an organisation because they represent scarce, imitable capital. Therefore, modern organisations seek to keep up with rapid technological developments and changes by supporting their human resources and developing training programmes to utilise artificial intelligence technologies, thereby increasing productivity and achieving their desired goals.

As reliance on artificial intelligence tools increases and the shift towards computer-based human resource management grows due to the rise in digital data, human resources will be among the areas most affected by these changes, for better or worse — especially given the emergence of new jobs and the disappearance of others.

The main question raised is therefore:

Main question:

What is the future of human resources in the age of artificial intelligence?

This question encompasses the following sub-questions:

- What is artificial intelligence?

- What are the most important technologies used in human resource management?
- How does artificial intelligence contribute to human resource management?

Study hypotheses:

In order to address the raised question, the following hypotheses will be proposed:

- Artificial intelligence consists of technologies capable of mimicking human intelligence in order to perform tasks that people carry out.
- AI will bring about a qualitative shift in many jobs by eliminating some roles and replacing them with new ones, while also creating diverse employment opportunities.

Study objectives:

The study's aims can be summarised as follows:

- Highlighting the concept of artificial intelligence.
- Identifying the future of the labour market in light of the increasing use of AI technologies.
- Determining the pros and cons of using AI in human resource management.

Study methodology:

To achieve the study's objectives, a descriptive approach was adopted using books, articles and theses related to artificial intelligence and human resource management.

Section One: Artificial Intelligence and Its Technologies Used in Human Resource Management

Artificial intelligence has witnessed rapid growth in recent years, especially since 2016 — the year when its technologies were introduced to all fields, including human resource management. The growing importance of AI is mainly due to the positive and accurate results achieved by its algorithms.

First requirement: The concept of artificial intelligence

The first research into artificial intelligence dates back to 1950 by the British mathematician Turing. Just one year later, researchers invented the first machine capable of conducting a human-like conversation. To test its effectiveness, Turing devised a role-playing test. He placed a robot and a human in front of a blindfolded person to see if they could tell the difference. Remarkably, the person was unable to tell the difference.

Six years later, a group of 20 American scientists gathered, including McCarthy, Johan, Claude Shannon, Marvin Minsky and Nathaniel Rochester (ALVAREZ & BEATRICE, 2020, p. 5). In 1955, they met to propose a research project on artificial intelligence, which was implemented at Dartmouth College University in the United States in the summer of 1956. During this event, the term 'artificial intelligence' was introduced for the first time. (Rocheleau-Houle & Pelletier, 2021, p. 5).

After that, AI continued to develop quickly until the 1980s. At the beginning of the 1990s, it achieved impressive growth and progress thanks to major global partnerships, such as IBM. It then reached its peak in 2016, which became known as the year of artificial intelligence. During this

period, a robot was created that outperformed human intelligence. For instance, Libratus defeated the world's four top professional poker players in 2017. (Blanc, 2017, p. 14).

First: Definition of artificial intelligence

Artificial intelligence (AI) can be defined as 'a set of technologies that enable a machine to simulate human intelligence, such as learning, prediction, decision-making and perception of the external world in the case of an automated system, and the application of AI to digital data' (Rocheleau-Houle & Pelletier, 2021, p. 5). Peter Capelli also defines AI in general terms as high-quality technologies that enable computers to perform tasks requiring human cognition, such as understanding content and making decisions. Meanwhile, Yann Le Cun defines AI as a set of technologies that imitate human intelligence and enable machines to perform human functions such as vision, navigation, sorting and organising information, understanding languages and making decisions (ROCHELEAU-HOULE & PELLETIER, 2021, p. 5; RODER, 2019, p. 12). (Roder, 2019, p. 12).

In contrast, Stéphane Roder defines AI as all technologies that enable a computer to imitate human intelligence. The concept of AI has only emerged in recent years, although its existence can be traced back to the deployment of computer algorithms designed to replicate human thinking.

Based on these definitions, it can be concluded that AI is a set of modern technologies that enable machines to exhibit intelligence comparable to, and sometimes superior to, human intelligence. This enables them to carry out complex tasks quickly and cost-effectively, such as visual perception, object sensing, navigation, sorting and organising information, language comprehension, conversing and decision-making.

Second: the most prominent pioneers and leaders in artificial intelligence.

1. Google

Google is one of the most important companies focusing on artificial intelligence. It typically relies on an acquisition strategy: in 2014, for example, it purchased the British company DeepMind, which developed neural networks for playing video games. The company's current objective is to explicitly seek to understand intelligence. In 2017, its Go programme (AlphaGo) was ranked first globally in the field of gaming. It has been developed to play against itself and is stronger than previous versions, representing the first example of unsupervised learning. Google also has its own recommendation engine, Home Google, and provides a smart speaker and voice assistant available in three different versions.

2. Facebook

Facebook is considered one of the largest users of artificial intelligence. It selects the messages it displays through recommendation engines. Recently, Facebook has also introduced an AI engine designed to detect suicidal tendencies.

3. Amazon

Amazon uses artificial intelligence in its Echo recommendation engine and its Alexa-based voice assistants, which are available in seven different versions. These tools offer services via cloud

platforms. Amazon also provides artificial intelligence-based services such as speech recognition, conversational robots and chatbots.

4. Apple

Apple invests heavily in artificial intelligence. The company provides a blog through which it explains its various lines of research, and it has developed a high-performance speech recognition system. This system uses the latest generation of neural networks to understand requests and commands, even in noisy environments such as streets. Apple is also expected to launch its own recommendation engine, HomePod, which is a smart speaker connected to Apple Music, soon.

5. IBM created Watson, an artificial intelligence system. Initially designed for gaming, IBM launched a game titled Jeopardy—similar to the French programme Questions pour un champion—in which Watson analysed 200 million pages to defeat previous champions and win first prize. IBM has since further developed Watson so that it encompasses multiple domains, such as medicine and law. IBM has also created a dedicated artificial intelligence blog. IBM has also proposed Watson APIs that are characterised by openness, allowing individuals to access and benefit from them. These are similar to Amazon’s guided deep learning interface, which is freely available to all. This differs from Facebook, which does not share its research or provide usable software interfaces. However, it has recently opened access to its educational environment free of charge under the name Caffe2 (SOUDOPLATOFF, 2018, pp. 26–27). (SOUDOPLATOFF, 2018, pp. 26–27).

The second requirement: Contributions of Artificial Intelligence to the Field of Human Resource Management

Artificial intelligence plays an important role in improving HRM and enhancing its performance by providing a set of technologies that increase the efficiency of HR functions by delivering accurate results in a more time- and labour-efficient manner.

First: The most important uses of artificial intelligence in human resources

Artificial intelligence has many applications in human resource management and affects many activities. The main uses can be summarised as follows:

Artificial Intelligence	Recruitment	▪ Automatically filling in information and using it for the automated analysis of CVs. ▪ Providing recommendations and tailoring job offers. ▪ Providing chatbots to guide candidates towards the right job. ▪ - Screening CVs using keywords to identify competencies. ▪ Pre-qualifying candidates for the position using video technologies.
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	Human Resource Management	▪ Matching candidates' qualifications with available job offers . ▪ Sending personalised emails . ▪ Using it to guide and onboard new Human Resources employees . ▪ Deploying virtual assistants to support HR personnel with their daily administrative tasks . ▪ Detecting the emotional state of HR personnel to prevent psychological risks.
	Administrative Management	▪ Automating the payroll and wage system . ▪ Delegating social declarations . ▪ Centralising HR management operations such as time tracking and leave requests . ▪ Improving administrative management by providing greater transparency of real-time absence data that is automatically updated and added to training lists and inventory registers.
	Training	▪ Supporting the identification of areas for developing human resources . ▪ Tailoring development plans . ▪ Personalising training content, format and pacing through adaptive learning . ▪ Using virtual reality in the training process.
	Competency Management	▪ Providing a virtual professional coach . ▪ Matching human resources with assigned tasks and available job opportunities . ▪ Designing and updating the skills/competency inventory . ▪ Assisting HR with forward-looking management through predictive analytics . ▪ Identifying career preferences and performing future-oriented analysis of professional development and skills.

Source: (Roder, 2019, p. 15)

Second: the most important artificial intelligence technologies applied in human resource management.

Artificial intelligence was initially developed for use in commercial fields, such as marketing and production, where data is both available and of a high quality, making the resulting commercial returns more clearly observable. The disparity in the development of AI application use stems from the difference in “data culture” between these areas and human resources, compared with other organisational activities. Some of the most important AI technologies used in human resource management can be summarised as follows:

1. Automatic language processing: a set of technologies that automatically process human language and oral speech.

2. Chatbots: Conversation robots that have been programmed to interact with individuals through automated messaging services and process written data.

3. Voice bots (speaking robots): Conversation robots that are programmed to communicate with individuals. They can process voice exchanges and utilise various AI techniques evident in HR management processes such as training, recruitment/selection, compensation, transfers and reassignments, attendance monitoring and administrative management (AYZAC & CHEVALEYRIAS, 2020, p. 44). (AYZAC & CHEVALEYRIAS, 2020, p. 44).

4. Machine learning: One of the branches of artificial intelligence in which algorithms are programmed to learn independently. There are three main types of machine learning:

a. Supervised learning: In supervised learning, the AI system learns to predict values based on input data. This requires paired inputs. For example, the system can learn to recognise the objects contained in certain images using previously labelled data.

b. Unsupervised learning: The AI system learns to identify similarities within raw data and divide it into homogeneous groups. Learning occurs by determining relationships between data.

c. Reinforcement learning: The AI system learns how to act in its environment in a way that aims to maximise the reward it receives during training. This technique has enabled AI systems to outperform humans in video games such as Go.

5. Deep learning: A branch of machine learning that relies on multi-layer digital neural networks. It is the technology behind the most recent developments in artificial intelligence. (Rocheleau-Houle & Pelletier, 2021, p. 55).

Section Two: The Impact of Artificial Intelligence on Human Resource Management

Viewpoints diverge significantly, oscillating between optimism about the future of professions in the era of artificial intelligence — on the grounds that it will create new jobs — and pessimism about the fate of jobs and human resources. Nevertheless, it is undeniable that AI will have a substantial impact on jobs and how they are performed.

First requirement: Human Resource Management Policy in the Context of Adopting Artificial Intelligence

Human resource management is responsible for defining the framework through which the organisation adopts artificial intelligence, in consultation with its stakeholders. The department works to ensure a balance between human resources and the technology used, and determines the adopted human resource management policy and the impact of artificial intelligence on the organisation. This is reflected in its contribution to the integration of AI business applications with job functions, and in the development of human resource intelligence within HR practices. In this way, HRM can respond to the new challenges associated with organisational transformation resulting from the adoption of AI in policies and activities. (AYZAC & CHEVALEYRIAS, 2020, p. 42).

According to a Sia Partners study, 40% of organisations are considering fully automating their activities over the next five years. More than 80% of processes will be automated, allowing human resources to focus solely on value-added activities requiring training.

This will present human resource management with the challenge of determining the impact of incorporating artificial intelligence at the level of human resources in particular and the organisation as a whole.

First: The organisational dimension

1. Strategic Human Resource Planning

Strategic human resource planning involves analysing the impact of artificial intelligence on competencies and role/job transformation at task level. Initially, the impact of AI may be qualitative, before shifting towards the content of newly created jobs and the competencies required to work as AI specialists in the field of artificial intelligence. In contexts such as manufacturing, the impact becomes quantitative, leading to new investments and the emergence of new organisations with a potentially significant effect on human resources across certain professions.

2. Recruiting human resources with skills in digital sciences represents a real challenge.

Human resource management involves introducing new work requirements for candidates, such as proficiency in widely used technologies including machine learning, deep learning and natural language processing. In this context, organisations need to intensify their efforts to attract outstanding artificial intelligence talent — resources that are highly volatile in the global labour market. Regarding compensation, human resource management policy has introduced new employment conditions, such as proposing that candidates work on integration projects and funding their scientific research.

Second: the dimension related to human resources.

1. Training human resources (employees) represents a major challenge in the context of occupational transformation.

One of the priorities of human resource management in this context is designing different models to enhance competencies, as well as educating human resources in artificial intelligence and training them in digital sciences. This requires continuous education to enable beginners and intermediate-level employees to acquire specific AI-related competencies through in-person training, whether

internal or external. It also involves offering remote training courses and enabling machine learning-based learning. Accordingly, the organisation will strengthen its investment in AI competencies across different roles and levels of decision-making.

2. Transfer and career path management

Job development is one of the most important priorities of human resource management, particularly supporting employees during the transition to new roles and job positions created by the incorporation of artificial intelligence. Additionally, attention must be given to the quality of working life and occupational health and safety. While it is not possible to identify all the impacts on human resources, two key points can be highlighted: first, the reduction of repetitive tasks thanks to artificial intelligence solutions, which is a positive development; and second, the risk of cognitive exhaustion resulting from focusing on tasks with added value. (AYZAC & CHEVALEYRIAS, 2020, pp. 42–43).

Second requirement: Artificial Intelligence and the Transformation of Jobs

Integrating artificial intelligence tools into organisations will bring about a qualitative shift in many jobs by replacing numerous tasks, which will affect many professions. While replacing tasks within a job does not necessarily mean replacing the job itself, the job may be at risk of disappearing if many of its tasks are replaced, causing it to lose its value and role — after which it may ultimately be eliminated.

First: The Risk of the Disappearance of Certain Jobs

If industrialisation previously changed the nature of work, artificial intelligence today represents a new kind of revolution. It not only targets the transformation of jobs and the associated tasks, but also affects the very identity of human resources and their intelligence. While traditional automation replaced human labour, digital automation replaces human thought and information processing, making it a relatively easy model for economic replication. This will impact the labour market.

Artificial intelligence is renowned for its remarkable ability to deliver accurate and high-quality results. For instance, the error rate of the best facial recognition algorithm was 0.08% in 2020, compared to an estimated 4.1% in 2014, according to tests by the National Institute of Standards and Technology (NIST). AI tools can perform tasks that require perception — tasks that were previously limited to human cognition alone. They can therefore replicate the tasks carried out by human resources, contributing to profound changes in the world of work.

This raises the question: will the creation of new jobs and wealth offset the loss of existing roles? Opinions diverge on the answer to this question. On the one hand, Frey and Osborne (2013) and Westlake (2014) expressed concerns about the disappearance of certain jobs due to increasing reliance on AI. In contrast, Frey (2019) and Calo (2018) adopted a relatively neutral position. Meanwhile, Harari (2017) and Danahar (2020) are optimistic about the future of jobs amid the growing adoption of AI.

A widely cited 2013 study, which relied on more than 9,000 academic articles, found that 47% of jobs in the United States are at risk of automation by 2030. Additionally, research centres, advisory

firms, government agencies and the media have sought to identify the jobs most exposed to automation risk. (COTE & SU, 2022, pp. 147–148).

The functions have been classified in a specific way, distinguishing between those that are less at risk of disappearing and can be automated, such as business management, finance, digitisation and education, and those that are more at risk of being replaced, such as jobs related to services, sales, administration and transportation. (Bensoussan, 2016, p. 50).

Around 50% of current jobs are therefore likely to undergo significant changes, potentially resulting in radical transformation. It is therefore clear that, behind this average proportion, there are highly contradictory situations and that the effects will be significant for most organisations. Moreover, the logic of ‘replacement’ may be exaggerated. Manuel Zacklad has specified two logics: ‘rationalisation’, in which algorithms direct work, and ‘capability’, in which the efficiency of human resources is supported by machines. There is no consensus on whether human labour will be replaced by robots in the future. In any case, a study by Teradata shows that 21% of respondents expect artificial intelligence to replace human labour for most tasks within an organisation. Meanwhile, 45% believe that tasks will be divided between human resources and AI tools, and 29% think that integrating human labour and machines will enhance human capabilities. (GIBLAS, 2018, p. 25).

Secondly, there is the possibility of creating new jobs.

Many studies suggest that technological developments related to artificial intelligence will have a positive impact on job creation. This viewpoint is supported by the historical effect of technology on job creation. Previous experience shows that each technological development leads to some jobs disappearing and others emerging. The labour market adapts to changes in the context of adopting modern technologies, as well as to the appearance of jobs directly related to the manufacturing of this new technology. According to these studies, artificial intelligence technology will follow the same path as its predecessors. Fery’s analysis in his 2019 book *The Technology Trap* suggests that job creation resulting from AI technology development will occur in two phases: short-term and long-term impact. While it is certain that AI technology will contribute to the creation of new jobs, there is no guarantee that these jobs will emerge in the same place and at the same time as those that disappear as a result of AI development. Furthermore, the new jobs may require skills and abilities that differ significantly from those required by the vanished jobs. Those who have lost their jobs are not necessarily the ones who will take on the new ones. This obliges organisations to upskill and reskill them to help them acquire the required competencies. Those lacking talent, skills and competencies are more vulnerable to job loss due to AI technological development, as well as facing difficulties in obtaining new employment. Conversely, individuals with talent and competencies can contribute to the creation of new jobs. (Rocheleau-Houle & Pelletier, 2021, p. 18).

According to a World Economic Forum opinion poll, some respondents believed that automation would reduce the demand for full-time human resources. However, it would also contribute to the

creation of new jobs and the emergence of other roles within organisations. These new jobs and roles are essentially related to technology or to searching for and managing human resources. They are characterised by a high capacity to deliver the required quality, including: communication quality, the ability to understand complex emotions, management quality, imagination, empathy, critical thinking and, above all, the capacity for innovation, among others.

Jobs requiring this type of skill set will certainly be available, helping to fill the gaps left by the disappearance of roles due to artificial intelligence. Based on previous experience, we know that technological innovation usually creates work opportunities to match or exceed the number of jobs eliminated. These new jobs will also offer higher pay and stronger incentives than their predecessors. However, it cannot be confirmed with complete certainty that the effects of artificial intelligence will make the labour market self-regulating. Put simply, AI will contribute to the creation of many more jobs than were eliminated. Even if the labour market is found to be self-regulating, there will necessarily be a transitional period during which the workforce is redistributed by region. The newly created jobs will not necessarily be located in the same areas as the cancelled jobs, forcing human resources to relocate. Additionally, the jobs resulting from the adoption of artificial intelligence will require different competencies to those previously required. Therefore, a transitional phase is necessary before the labour market can reach a state of self-balancing. (Rocheleau-Houle & Pelletier, 2021, p. 14).

From the perspective of proponents of the Austrian economic theory of creative destruction, as described by Joseph Schumpeter, the disappearance of jobs due to the adoption of artificial intelligence is a logical consequence of innovation. This leads to the creation of new job opportunities that cannot currently be imagined by the human mind (AYZAC & CHEVALEYRIAS, 2020, p. 34). The newly created jobs will offer high-quality wages and incentives, and their content will differ significantly. Consequently, human resources will need to learn new tasks and undergo training to work alongside machines.

Conclusion:

Although integrating artificial intelligence tools and techniques into human resource management will facilitate the management process, improve the quality of administrative procedures and reduce spending, wasted time and effort, this does not come without risks resulting from excessive automation. While it may be premature to discuss the potential damage that artificial intelligence could cause, the benefits it could offer and the jobs it could create in the future are almost impossible to imagine at present. What a human resource professional can accomplish in one hour, artificial intelligence can accomplish in one second. Automation will therefore free up human resources to focus on tasks that require creativity and innovation, rather than routine work.

Accordingly, the study reached the following results:

- Artificial intelligence is a technological revolution that will transform the field of human resource management by reducing effort and time, and improving the quality of administrative processes.

- Artificial intelligence technologies are characterised by the quality of their outputs and the high accuracy of the results they provide.
- Introducing artificial intelligence technologies and tools into an organisation will eliminate some jobs, resulting in harm to human resources and an increase in unemployment.
- The growing adoption of artificial intelligence by organisations will create new jobs and intense competition in the production of this technology, leading to radical changes at organisational level. Despite the opportunities presented by integrating artificial intelligence into human resource management, concerns remain about relying on this technology.

This study also presents a set of recommendations, the most important of which are:

- Preliminary preparation of human resources and training them in artificial intelligence techniques by providing the necessary courses and training sessions to facilitate the integration and acceptance of inevitable changes resulting from the use of artificial intelligence technologies within the organisation.
- Encourage innovation and creativity among human resources. In the world of artificial intelligence, there is no place for people with limited ideas. Therefore, the relevant authorities should integrate artificial intelligence into educational curricula at all levels, from training centres to universities.
- Providing a suitable infrastructure to enable the adoption of this modern technology.
- Rational use of artificial intelligence technologies and achieving a balance between using AI tools in the organisation and utilising human resources.
- Developing solutions and ensuring the provision of alternative jobs for human resources whose positions may be eliminated by redeploying them to roles that match their competencies and skills.

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