

Artificial Intelligence in Human Resources practices. An exploratory study.

BADDOUH Lina

Mohammed V University Rabat, Morocco

l.baddouh@um5r.ac.ma

LOUALI Imane

Mohammed V University Rabat, Morocco

imane_louali@um5.ac.ma

EL ABBOUBI Manal

HDR Professor,

Mohammed V University Rabat, Morocco

manal.elabboubi@fsjes-agdal.um5.ac.ma

Abstract

The advent of Artificial Intelligence (AI) in the organizational sphere and the dithering it has caused in several areas of life, especially in the managerial field, is no longer to be demonstrated. However, it is clear that more and more researchers are paying particular attention to the study of artificial intelligence, its components and its real impact on organizational performance, especially on HR processes. Thus, our study analyses of the place of AI in HR management practices in the particular context of Morocco. To do so, we opted for an exploratory qualitative study based on semi-directive interviews conducted with ten organizations in Morocco of different sizes, aiming at analyzing the place of AI in six HR dimensions, namely; planning, recruitment, training, performance management, compensation management as well as employee relations management. Although the study showed that AI is still struggling to find its place in HR management processes in Morocco, managers have shown themselves to be open to its introduction in their development strategies. This requires an advanced digitalization with an organizational culture favoring autonomy, agility and openness to new management tools.

Key words: Human Resources - Artificial Intelligence - HR processes – Management - Digitalization.

Introduction

The application of Artificial Intelligence (AI) technology has become an important trend in the future development of human resources management recently. Between 1950 and 1960, researchers John Von Neumann and Alan Turing had not yet coined the term AI, but would be its founders. At that time, they were interested in building machines that could think like humans. Rich (1983, p61-82) defines AI as "*the study of how to make computers do things that, at present, people are better at.*" Over the years, AI has been used in different fields and one of its most promising applications is in human resources (Bailie, I. and Butler, M.M., 2018). This can help optimize recruitment, selection, training and talent management processes. In an article titled "*Artificial Intelligence and Human Resources: The Need for Ethical Consideration,*" published in the *Journal of Business Ethics*, the authors note that "*AI can help human resource professionals make faster, more accurate, and more equitable decisions about recruiting, selecting, developing, and retaining talent*" (Bapna and Gupta, 2019, p791-799). AI algorithms, according to Huang et al., (2018), can help evaluate candidates using objective criteria and predict future employee performance. However, there are also concerns about its impact on HR dimensions. The use of AI in human resources can offer many benefits in efficiency and objectivity. Scientific research on AI and HR is relevant because it can improve decision making, streamline HR processes, improve employee experience, and increase productivity. This allows companies to remain competitive in the market and create a healthier and more productive work environment for their employees.

New technology and the introduction of artificial intelligence tools are proving their worth in the West. Kathleen S. Hornsby et al - In the article "Artificial Intelligence in HR: The Future of Workforce Management" (2018), examine the impact of artificial intelligence on human resource management, highlighting the potential benefits of this technology to improve the efficiency and productivity of HR processes. A study by Kooij et al. (2020) found that AI can improve employee engagement and satisfaction by providing personalized information about career development opportunities and benefits. These results suggest that AI can play an important role in improving the effectiveness and efficiency of human resources management processes.

However, the article by Zheng and Li (2020) points out that AI offers many opportunities to

improve human resource management, but those opportunities must be evaluated in light of the challenges and limitations associated with this technology. Among the drawbacks and difficulties cited by the authors are the reproduction and amplification of existing human biases, as well as employee reluctance to use AI technologies, which can reduce the effectiveness of their implementation. Although AI can perform many tasks autonomously, it often requires human supervision to ensure fairness, ethics and regulatory compliance. In addition, Émilie Lapointe and Suzanne Rivard (2020, p13), in their article published in "International Journal of Information Management" which examines the financial impact of artificial intelligence on human resources management, demonstrated that *"the use of AI in human resources management can generate significant cost savings for companies, but it can also result in additional costs in terms of training, talent acquisition, and maintenance of AI systems."*

In the same vein, Wang et al. (2020, p21) point out in their article "Artificial Intelligence in Human Resource Management: Challenges and Opportunities", that *"installing AI in HR requires a solid technological infrastructure and an innovation-friendly corporate culture. They also recommend adequate training for staff to effectively use AI in HR."* This has led us to conduct this research in order to find out the level at which Morocco stands, given its digital transformation policy, and to compare the similarities of this technology to Western countries in terms of its existence, and if not, the obstacles that hinder its adoption. It is from this compelling observation that we are interested, in this research, in understanding the place of AI in HR processes. We focus on the Moroccan context in the sense that economic developments are booming and the arrival of AI as a managerial tool is becoming increasingly prevalent. We have noticed little to no documented studies on the subject in Morocco, which motivates us to ask the following research question: what is the place of AI in managerial tools dedicated to HR in Morocco?

To answer this question, we will dedicate the first section of this article to the literature review related to the integration of AI in the organizational strategy of human resources through the study of six dimensions which are: 1) planning, 2) recruitment, 3) training, 4) performance management, 5) compensation management and 6) employee relations management, by synthesizing the approaches and frameworks. This section will allow us to clarify what we mean by AI in HRM and the reasons for its adoption. The next section discusses the qualitative research methodology we adopted. The third section describes the key data related to our study which we will discuss in light of the literature. Finally, in the last section, we discuss the limitations of the study and offer suggestions for further research.

1. Theoretical framework of the research

1.1 The place of AI in HRM

Since the first technological revolution, companies have reinvented the way they work, and this has not changed. The number of strategic applications of IT in HRM has exploded in recent years (Florkowski & Olivas-Luján, 2006). New digital technologies have challenged traditional HRM practices in various ways (Florkowski & Olivas-Luján, 2006). Digital transformation is changing the way HR processes are conducted. As more and more companies adopt digital technologies, they are also transforming the way they manage their human resources. From digitizing processes to using artificial intelligence. The emergence of new technologies, including artificial intelligence (AI), is disrupting the way organizations operate on many levels (processes, organization, strategy, communication, finance, etc.) (Blaschke, 2017). Not surprisingly, there is growing interest in the use of AI in HRM in academia. Emerging research shows that AI can provide great benefits to businesses by improving the HRM performance of companies (Faliagka et al. , 2014). Others argue that companies are not ready for AI in HRM due to a lack of expertise (Tambe et al. , 2019). Previous research on AI has primarily been conducted in disciplines other than HRM, with a focus on computer science techniques (Faliagka et al. , 2014). While some studies in management research address the use of AI in HRM, they are more descriptive, targeting practical applications rather than theoretical contributions (Ransbotham et al., 2017; Tambe et al., 2019). Improving the effectiveness of human resource management through the application of AI technology has become an important trend in the future development of human resource management (Jia et al., 2018). Today, innovative technologies are dynamically reinventing the human resource management (HRM) landscape globally (Ancarani et al., 2019). Indeed, with the accelerating development and widespread application of artificial intelligence (AI) and other disruptive technologies, the interaction between companies, employees, and customers is fundamentally changing, and the automation of administrative components of HRM activities and tasks is intensifying (Lariviere et al., 2017; Marler & Parry, 2016).

Although the technological evolution of HRM can be traced back to the industrial revolution, technological advances had simply changed the physical or mental services. Contemporary developments, however, increasingly provide alternatives to human resources in functions traditionally requiring human interaction and communication (Malik et al. , 2019; Luo et al., 2019), changing both organizational structures and the nature of work (Colbert et al., 2016). Humanoid service robots and artificial intelligence bots, for example, are increasingly attracting industry attention (Araujo, 2018; Go & Sundar, 2019; Lariviere et al. , 2017; Thomaz et al.,

2020). These intelligent "beings" have revolutionized traditional human resource functions, offering increasing strengths and potential for HRM, but also formidable challenges, including the obsolescence of specific jobs (Malik et al., 2019; Lariviere et al., 2017). At the same time, deep learning algorithms, smart objects, and the Internet of Things (IoT) are particularly useful for companies operating across borders, as they can foster more productive coordination and cooperation (Cooke et al., 2019). Similarly, the introduction of electronic human resource information systems and other emerging technologies offer several opportunities to improve and reduce the cost of HRM functions, including, but not limited to, job applicant assessments (Bondarouk et al., 2017; Cooke et al., 2019) and employee performance evaluations (Abraham et al., 2019; Parry & Tyson, 2011).

1.2 The dimensions of HRM

According to (Noe et al., 2006), the six dimensions of human resources management namely: (HR strategic planning, recruitment and deployment, training and development, performance management, compensation management as well as human relations management) are interconnected dimensions and interact to form an effective human resources management system. They are illustrated in Figure 1 and detailed as follows:

- Strategic human resources planning is a set of activities that enables the leaders of an organization to identify, evaluate and define their human resources needs while taking into account their objectives, action and development programs.
- Recruitment and deployment: This is a process, more or less long, in which different decisions are taken, one after the other. Starting with identifying the type of position to be filled, determining its missions, then the recruiter will look at the ideal profile, in order to launch the search for a candidate. Finally, recruitment includes the phases of selecting the suitors, their audition and finally the final choice.
- Training and development: Training is a "set of planned activities aimed at influencing the process of acquiring knowledge, skills, and attitudes in order to increase the effectiveness and efficiency of individuals, teams, and organizations" (Goldstein and Ford, 2002, cited by Rivard and Lauzier, 2013). It generally arises from an organizational need, following a formal process that aims to achieve targeted objectives for an employee or a group of employees. Human resources development is part of a medium and long-term professional development perspective. It can be defined as a process of developing human expertise through organizational development, personal development and/or training, in order to increase individual and collective performance (Swanson and Holton, 2001)

- Performance management is at the heart of the six dimensions. It is also the main entry point for the other dimensions. It aims to ensure that all activities meet the organization's objectives in an effective manner.
- Compensation management is a critical component of talent management and employee retention. It involves providing financial and non-monetary benefits to drive hires, boost performance, reduce turnover and foster employee engagement.
- Employee relationship management is defined as the process of managing relationships within an organization. It encompasses both the relationship between employees and the relationship between employees and the organization as a whole.

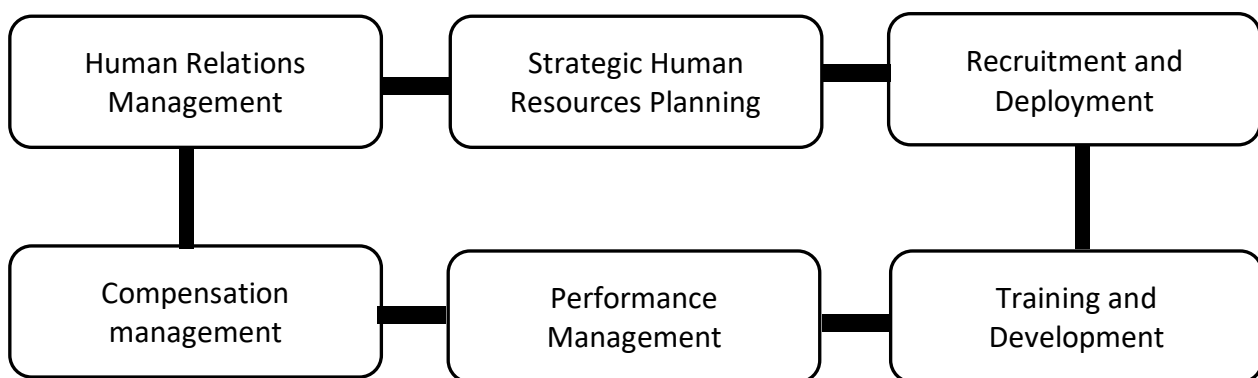


Figure 1: The six dimensions of human resource management (Noe et al. , 2006)

1.3 The application of artificial intelligence to the dimensions of HRM

AI in the context of HR management can be considered a broad class of software algorithms by which a computer performs HR management activities, usually requiring human cognition and intervention (Meijerink et al., 2021). These activities range from employee recruitment to job planning, performance evaluation, and day-to-day employee training and coaching. AI is presented as an opportunity to reduce the costs associated with the HR department, increase the efficiency of HR management, and foster the strategic role of HR professionals within the organization (Hennebert & Bourguignon, 2021).

AI & HR Dimensions : Application Tools

AI & Strategic HR Planning :

A growing number of AI solutions are being used to provide predictions and assist managers in making decisions. Depending on the application area, these technologies sometimes support the decision-making process or they completely replace managers to make decisions for them (Rio-Jeanne, 2019).

Forecasting and decision-making systems are based on massive data banks (big data). For example, they are used in human resources management processes and allow decisions to be made regarding hiring, promotion, performance evaluation, training or staffing (Di Iorio, 2020). In addition, algorithms refer to large data sets to make decisions in order to make a given action more reliable, optimize a mode of operation, or even avoid an incident (Rio-Jeanne, 2019). Managers use artificial intelligence technology to make decisions, which can help them plan more effectively. First, they use the technologies to collect aggregate information. After summarizing the information, they can understand how people are currently behaving and what their future behavior might be. They can then use the intelligent decision support system to provide them with the necessary information.

AI and Recruitment:

HR recruitment is under the significant influence of technology (Lee, 2011). Several studies have illustrated the implications of AI in HR recruitment, with focuses on candidate attitudes toward AI (Suen et al. , 2019; Van Esch et al., 2019) and the fairness of AI recruitment (Lambrecht & Tucker, 2019; Suen et al. , 2019).

The recruitment process involves screening and evaluating resumes and then recommending appropriate positions to candidates. By using artificial intelligence through optical character recognition (OCR) and megadata methods, Ideal Corp was able to reduce recruitment costs and increase recruitment efficiency. In this process, AI has the ability to screen candidates without bias (Hutson, 2017).

In the field of recruitment, AI refers to intelligent machines and software that behave and act like humans without any human intervention (Lisa & Talla Simo, 2021; Islam et al. , 2021). Facial recognition techniques can be used to allow the recruiter (robot) to authenticate the candidate (Jain & Li, 2011). The use of natural language processing technology eliminates the need for typing and the conversion of speech to text does not take much time, which will greatly improve the efficiency and accuracy of the recruiter's work. In addition, the system can also select a candidate based on the voice test method. Then, the megadata method is used to collect the information of applicants, filter the vacancies, match the interview results of applicants, analyze their personality characteristics, advantages, disadvantages and match the positions. Correspondents can be contacted following personality analysis and IQ/EQ tests.

AI and Training:

As a result of the rapid technological changes that have occurred in recent years, it is important to ensure that employees keep up with and adapt to improvements in task performance within an organization (Barboza, 2019). Therefore, learning and development provided to talent to improve their job skills must be applied within the company (Sekerin et al. , 2018). Human resource managers can also determine the best timing for new scheduled training based on individual employee preferences (Maity, 2019). The use of AI in the human capital development process has become a powerful avenue in organizations as learning and development programs are more effective than traditional training programs (P.Matsa & K.Gullamajji, 2019).

Indeed, by using AI-based algorithms, learning programs can be customized, which will allow the company to monitor and study the skills, attitudes and behaviors of different employees at different levels (Wolor et al. , 2020).

AI can help plan, organize, coordinate, and develop training programs for all talents in a way that categorizes them according to their skills.

Besides, AI will also help the employer and employee to discover the gaps in their performance, knowledge and skills by providing feedback after the learning programs to improve their process of the work (Wang & Lin, 2020).

(Wamba - Taguimdje et al. , 2020) stated that organizational performance would increase when the company adopts AI-based human capital development tools to cope with the increasing volumes and changes in learning and development contents. This claim is supported by (Sima et al., 2020) because they stated that AI tools would improve organizational performance by providing employees with up-to-date skills.

AI & Performance Management:

AI technologies facilitate the employee evaluation function and now allow for multiple factors to be considered. They mark a shift from direct, physical control by the employer to a remote control model based on data collection (Aloisi & Gramano, 2019). HR uses a wide range of sources, such as sensors embedded in smart devices, GPS tracking, sociometric badges, and access control systems to collect data on employees. This data includes their behavior, location, relationships with co-workers, manager satisfaction, customer satisfaction and even their emotional state. This information is analyzed by AI to assess their performance and productivity at work (Lengnick-Hall et al., 2018).

As such, some systems could give managers the ability to measure, in real time, employee productivity. For example, managers could track: the amount of travel that employees have to do in the course of their work, the speed at which an employee processes files or even writes a

document (CEST, 2019). As such, in the context of public administration, these uses of AI could fit well with the managerial practices associated with the new public management that emphasizes performance measurement and evaluation (Veale and Brass, 2019).

By using the intelligent decision support system, some scientific evaluation methods, such as 360-degree performance evaluation methods, can be used more automatically and quickly (Otley, 1999). These assessment methods are programmed and entered into the decision support system to more efficiently account for employee assessment results.

AI & Compensation Management:

Compensation management, is a dynamic management process that determines, allocates, and adjusts employee compensation principles, strategies, levels, structures, and factors, based on organizational development strategies (Henderson, 2003).

AI-based electronic compensation programs, such as Oracle's PeopleSoft eCompensation Manager Desktop, offer managers the ability to automate payroll options, manage salary values, and monitor compensation cycles. These automated payroll systems manage employees' base salaries, commissions, overtime and bonuses. These systems are reported to reduce errors in compensation actions by 80% because they are designed to comply with stricter financial regulations (Nobre, 2020).

The application of AI can help facilitate fairness in compensation management. BP neural network is a supervised artificial intelligence technology based on biology, neurology, psychology, and statistics. It can mimic the nervous system of the human brain, establish a regular computational model, and integrate multiple neural network nodes (Richard & Lippmann, 1991). The BP neural network system can be used to design an intelligent decision support system to train a fair salary evaluation system with the input of big data.

AI & Employee Relationship Management:

Some technologies related to voice recognition, video analytics, and facial recognition can, through the analysis of facial micro-expressions, posture, and speech, detect signals of disengagement and demobilization of employees (Rio-Jeanne, 2019). The use of these technologies thus allows managers to be on the lookout for the behaviors and attitudes of teammates in order to take the right actions to foster collaboration between colleagues, improve working conditions and satisfy employees. However, these tools could also be used to monitor workers' behaviour and facilitate their control by employers.

On the other hand, AI technology can assist managers and their teams in recording, scheduling, reporting or keeping a dashboard. Examples of AI applications in this area include the "virtual

assistant system," which organizes meetings by reading and writing emails, coordinating participants, and managing calendars. In the process, these intelligent systems will progressively improve the relevant knowledge and enrich the service areas. These systems expand the definition of artificial intelligence in the workplace and become what is called "advisory systems" (Jia et al. , 2018).

2. Methodology

Our exploratory study was conducted in March 2023 and was based on a sample of 10 companies operating in 10 different industries. It aimed to explore the place of AI in HR processes in Morocco and to understand the impact it has, or would have, on them.

Our research lends itself to a qualitative method. As such, we deemed it relevant to conduct individual interviews with HR professionals in Morocco. This method allowed us to collect detailed and precise information on the use of AI on various aspects of HR processes in Morocco. This method also allowed us to understand the mechanisms of integration of AI in HR for some companies, but also for those in the process of its installation, and those who do not apply it. This last category allowed us to approach HR managers to better understand their perception of the use that AI could have in their HR processes.

Based on the literature review we conducted, we focused our data collection on six dimensions of human resources which are: 1) planning, 2) recruitment, 3) training, 4) performance management, 5) compensation management and 6) employee relations management. More practically, we started by basing our interview guide on these six dimensions, to provide a consistent framework for the discussion with HR managers. We then populated the guide with open-ended questions to allow participants to freely express their experience with using AI in each of these dimensions.

In terms of our target audience, we interviewed HR professionals from various industries in Morocco using a convenience sampling. We consider this choice to be the most appropriate in our case because we do not have a database of companies that use artificial intelligence in their HR processes in Morocco. Secondly, in this sense, our choice was based on large companies, given their levels of digitalization and use of new technologies in their human resources department.

Thus, the companies selected in different sectors of activity are the following (Table 1):

Companies	Coding	Sector of activity	Size of the company
-----------	--------	--------------------	---------------------

E1	XA	HR Office	SMC
E2	XZ	Wellness	LC
E3	XE	Catering	LC
E4	XR	Transport and logistics	LC
E5	XT	Consulting firm	SMC
E6	XY	Telecom	LC
E7	XU	Television	LC
E8	XI	Employment agency Customer	SMC
E9	XO	Relations Center	SMC
E10	XP	Telecom Operator	LC

Table 1 : Companies studied

In terms of data collection, we proceeded in two stages. First, we examined the documents available online, in particular on the websites of the different companies. Thus, the most recent annual reports and activity reports were selected in order to obtain an overview of digital transformation policies, but also of actions and practices dedicated to the implementation of artificial intelligence tools. This step was not fruitful in terms of information available online only on the digitalization aspect. Nevertheless, the data related to the use of AI tools in human resources was limited. Secondly, we approached HR managers and conducted ten semi-structured interviews that were recorded and then transcribed. In terms of data analysis, we organized our corpus of data according to the six dimensions identified in the literature and classified them by company as presented in Table 2:

Dimension 1 : Planning	<ul style="list-style-type: none"> - How do you see the relationship between AI and strategic HR decision making? - Can AI replace humans in strategic HR decisions? If yes, at what level? What kind of decisions? If not, why wouldn't AI replace humans in strategic HR decisions?
D2 : Recruitment	<ul style="list-style-type: none"> - Do you use AI in your recruitment process? If yes: - How much has recruiting been influenced by technology? What are the tools of that technology? - How have its tools impacted your recruitment process? If no: What are the barriers to adopting this practice?

D3 : Training	<ul style="list-style-type: none"> - In your opinion, what role could AI play in the human capital formation process? - Have you tried AI in training? If so, what is your feedback? - What would be the difference between AI-based learning programs and other traditional programs? - Do you prefer an AI-based learning program or a traditional learning program? Which one do you think your employees will prefer?
D4 : Performance management	<ul style="list-style-type: none"> - How could AI be used in HR performance evaluation? - What would be the impact of this use on the employee evaluation process?
D5 : Compensation management	<ul style="list-style-type: none"> - Does your company currently use AI for compensation management? <p>If yes: - What AI-based e-reward programs do you use? What do they allow you to manage?</p> <ul style="list-style-type: none"> - Why have you chosen to integrate this new technology into your compensation process? <p>If not: - How do you see the future of AI use in compensation management and how does your company do for this change.</p>
D6 : Employees relations	<ul style="list-style-type: none"> - How does your company ensure communication and collaboration between different departments and employees? - Does your company currently manage human relationships within the organization through AI tools? <p>If yes: What is the contribution of the use of these tools for your managers?</p> <p>If no: How do you see AI being used in human relations management in your company in the future? What would be the benefits?</p>

Table 2: Interview guide

The underlying question that guided our data analysis was whether the companies we met with actually distinguished between the digitization of processes and the introduction of intelligent tools into those processes. Specifically, we sought to understand whether HR professionals in

these companies are using AI, and if so, at what level and through which tools. On the other hand, if they are not, we sought to identify barriers to introducing AI into HR processes. Our analysis took a horizontal form by dimension and then vertically by company. We used content analysis to identify recurring themes and patterns in the data. The results were checked by two researchers to ensure validity.

3. Interview Analysis:

➤ Strategic Planning:

Two major trends have marked the responses of the interviewed HR managers.

The first one confirms a strong link which exists between AI and strategic decision making, because this new technology represents an asset for the HR manager since the data collected by AI may help the manager in predicting and forecasting all issues related to HR functions. In this case, AI simply provides managers with intelligently analyzed and processed data to facilitate decision making. It is considered as a decision support tool for HR strategy

This came out from the following verbatims:

"The relationship between AI and HR strategic decision-making is close and crucial. AI can help HR managers in predictive analytics and relevant decision making in recruitment, training, retention and workforce planning. Moreover, it can also help with reducing unconscious bias in the recruitment process and managing employee performance." (HRD, XO, services)

"A manager using techniques of AI can make decisions to optimize a mode of operation, make an action more reliable or avoid an incident. Therefore, AI will allow supporting the decision-making process." (DRH, XT, services)

The second trend raises the critical points which are difficult to integrate by an AI at the level of strategic planning. These points were revealed by the HR Managers we've met. Concerning the intelligent data processing, our fieldwork has highlighted the aspects that are, difficult to manage by an AI, such as feelings, sensations, human interactions, coded language between employees (linked to specific cultures for example), ethics, management of interpersonal conflicts...etc. Thus, even if AI can provide intelligent data, the strategic missions cannot be treated by any intelligent machine.

This finding is based on the following verbatims:

"AI cannot replace humans in HR strategic decisions as they involve ethical and moral considerations, such as managing conflicts, diversity and inclusion, or making decisions related to social benefits and compensation. This decision type requires human reflection which

takes into account the complexity and subjectivity of these situations." (HR Manager, XI, Services).

"There are several reasons why AI would not completely replace humans in HR strategic decisions:

1. Hidden biases: AI algorithms can be distorted based on the data they have been used, which can lead to unfair or discriminatory decisions. HR professionals are better equipped to detect and correct these hidden biases.

2. Decision complexity: HR strategic decisions often involve complex considerations, such as employee relationships, corporate culture, legal and regulatory considerations, etc. Personally, I don't see how these factors can be quantified and integrated into an AI model.

3. Lack of empathy: According to my experience, I can confirm that empathy is an important quality for HR professionals when interacting with employees. Machines can be programmed to simulate empathy, but they can't feel it authentically." (HR Director, XO, services).

➤ **Recruitment:**

Based on our survey, this study has exposed different sides of the perception of AI in recruitment.

According to the answers collected, we generally observe a weak mobilization of AI in recruitment.

Indeed, except the recruitment companies that use AI tools for recruitment, all other companies we met, prefer to opt for e-recruitment.

Some companies are preparing their structures for a possible implementation of this new technology, moving from digitalization to automation of the recruitment process, while others are not yet planning to deploy AI and prefer digitalization due to the size of the company or its culture.

These observations are supported by the following verbatim statements:

"We use e-recruitment; our company is not ready yet for AI integration. Also, our company culture is not adapted to this kind of technology". (HR Manager, XU, audiovisual)

"We don't use AI in the recruitment process but we are ready to switch quickly to this new technology since we have already adopted e-recruitment at 100% level. After the Covid 19 crisis, the whole process was oriented towards a very advanced digitalization and nowadays we are in the automation phase." (HRD, XY, services)

"Our office has opened up the horizon of affinity recruitment through the Matching 4K technology, which is to:

- Identify the key personality traits of each candidate.
- Identify the values that drive each candidate.
- Modeling the culture of companies.
- Designing a matching technology between all of them.
- Synchronizing the results and recommending through Artificial Intelligence the ideal candidates and the perfect opportunities" . (HR Manager, XI, services).

➤ **Training and Development:**

Training via AI tools remains almost absent in learning models in the majority of the companies interviewed, however, their managers are aware of the important role that AI could play in the human capital training process, by personalizing training, according to the individual needs of learners allowing faster and more accurate feedback.

Indeed, most of companies adopt the traditional way of training and ideally an e-learning approach, which is considered by HR managers as a real step forward aiming to modernize several training projects.

Concerning their preference in terms of future learning methods, the companies we interviewed generally expressed a preference for a hybrid training model combining technology and traditional training.

This was revealed from the following verbatims:

"AI can offer a significant advantage to employees in terms of training, through targeted and relevant training which takes into consideration the needs and the ability of each employee."
(HR Manager, XU, audiovisual)

"We offer traditional training as well as E-Learning delivered by an external service provider specialized in training."

"The expression of training needs is entirely digitalized but we currently work on a project (Data Analysis) which consists of linking our HR database to the E-learning platform in order to define a future projection for training and also to analyze the possible evolution of careers"
(HR Manager, XY, services)

"We do not use AI in training but we would like to integrate it in the future in our learning methods in order to reduce costs, get time savings, reach flexibility and efficiency that this new technology may offer" (HR Manager, XE, catering)

"As HR Manager, I prefer to combine the two training programs (traditional & AI) because the objective of the training is not always focused on the content but it is a way to get employees

out of the daily stress, to strengthen the relationships between colleagues and to create a group dynamic. (HR Manager, XY, services).

➤ **Performance management**

Through our exploratory research, we have noticed that in addition to E-Assessment, which already exists in the HR field, AI has started to be integrated into performance management within the companies. Indeed, this new technology has allowed HR managers to gather and analyze a large amount of information related to the performance of employees so as to come up with an objective evaluation.

According to the HR managers interviewed, AI is used in the assessment of human resources performances in several ways and has a positive impact not only on the company but also on the employee.

These are few possibilities raised:

- Data analytics and competency assessment where AI is used in order to process data related to employee performance, such as production data, sales data, customer satisfaction data, etc. AI can analyze this data to identify trends, correlations and patterns that help understand employee performance and identify skills that need development through suitable training.

These findings are based on the following verbatims:

"We use AI for HR performance assessment, which allows us to reduce recruitment bias and make more relevant decisions concerning management of talents.

We rely on the Feel Good report from the 4K personality test built on 4K technology, to get an early indication, before even joining, of whether the candidate will naturally thrive in the company, and therefore perform well". (HR Manager, XI, services)

"We use a time management and access control system, a GPS system for the mobility of drivers and technical teams, in addition to the E-assessment which is based on several criteria to assign a score for each employee.

From the exploration of these data, we receive quickly an analysis of the existing failures, which allows us to direct the employee towards a precise training program, to propose a redeployment or to foresee a support for the employee facing this kind of situations". (HRD, XY, services)

"Based on our experience, the use of AI in HR performance assessment could have several impacts on the employee evaluation process, I can give as example :

Improving accuracy: AI is able to analyze large amounts of data and identify patterns that may be difficult for human evaluators to detect. This allows us to get more accurate and precise assessments.

Also, time savings: AI can perform real-time analysis and reduce the time spent on performance evaluation.

Increasing objectivity represents another positive impact because AI is not affected by biases or prejudices that could influence human evaluators. This allows us to get more objective and fair evaluations.

And finally, reducing human errors in the evaluation process, for example by avoiding data entry or calculation errors." (HRD, XO, services).

➤ **Compensation management:**

All HR Managers interviewed confirm the absence of the use of AI tools in compensation management, for two main reasons which are:

- The high cost of this new technology. As a result, all companies are opting for software that is considered sufficient, efficient and less expensive.
- The need to preserve human leeway and therefore HR managers do not want to entrust this crucial function to an intelligent machine.

Concerning the future use of AI in compensation management in Morocco, opinions are mixed between those who consider that its deployment is imminent and favorable to ensure pay equity in the future and others who refuse this new technology and prefer to automate the process and keep a human control over this HR dimension.

This analysis is based on the following verbatims:

"We do not use AI in compensation but only a software -AGIRH- FULL WEB, which gathers all HR functionalities (GPEC, compensation...). We prefer to keep a human intervention at a certain level of decision especially for the management of compensation". (HRD, XY, services)

"Compensation software is largely sufficient and we do not intend to use AI in this field". (HRD, XZ, services)

"We don't use AI but simple digital tools for salary management, given the size the company and also the significant cost that this can include". (HRD, XO, services).

➤ Management of human relationships

According to the answers collected, the management of human relationships is generally done through written, physical and digital communication through various channels such as: intranet, digital magazine, digital platform dedicated to internal communication.

AI is not mobilized at the level of this HR dimension but some companies are developing and installing AI tools in the short term because they consider that the use of AI in human relations management can bring several advantages. Others are planning to adopt a hybrid management mode in the future, keeping human interactions as the basis for managing relationships and then integrating AI to ensure part of the communication, provided that this eventual deployment takes into consideration ethical rules and employees' privacy.

This was revealed by the following verbatims:

"We do not use AI to manage human relations within the company. We have horizontal and transversal communication and we do encourage human contact." (HR Manager, XI, services)

"We are in the process of developing and installing an AI tool to ensure a better communication and organization of human capital, which will facilitate the management of different mails and its dispatching to all agencies in the kingdom." (DRH, XE, services).

"We do not use AI but only digital platforms. On the other hand, our communication department is currently preparing an internal communication solution based on AI. This project is in the design phase however it is important to mention that we would like to keep a hybrid form (AI + classic human relations). Moreover, it is important to emphasize that the use of AI in the management of human relations must respect ethical principles such as the privacy of employees". (HRD, XY, services)

4. Discussion

As far as strategic HR planning is concerned, authors Rio-Jeanne and Di Iorio confirm the support of AI in the decision-making process since it is based on Big Data collected and analyzed by AI.

Rio-Jeanne even mentions a substitution of HR managers in some cases, allowing AI to make decisions, while in the field, the companies we have met also confirm the fact that AI represents a decision support tool of HR strategy, however they insist that only HR professionals who have unique skills in the management of human interactions, including the management of interpersonal and cultural conflicts. For them, this is an important human factor in decision

making that cannot be replaced by an intelligent machine. This study challenges us to know more about the operational modalities of AI deployment at the level of strategic decisions.

On the other hand, concerning the second HR dimension which is recruitment, the literature exposes the use of AI in recruitment starting with the identification of vacancies, the sorting and selection of candidates up to the interviews through intelligent machines without any human intervention and by using several tools such as (mega data, facial recognition, voice test...). It should be noted that researchers (Huston, 2017), (Lambrecht & Trucker, 2019) and (Suen & al., 2019) have also evoked the consequences of the application of AI to this HR function, namely: the accuracy, efficiency and fairness of recruitment.

In the field, we have observed a weak mobilization of AI at the level of recruitment as described by the literature. Instead, we observed a lack of knowledge among the managers we met about the possible variants offered by AI. A perception often understood in terms of e-recruitment or digitization of selection processes. Only one company we met that specializes in investment applies AI in recruitment. However, our study shows that there is an interest in adopting AI in the future, in order to shorten recruitment times, standardize candidate selection criteria and optimize costs.

By comparing the literature and the field results, we conclude that the use of AI in recruitment is actually very embryonic compared to the author's description and its real deployment depends on several conditions, in particular its compatibility with the digital maturity of the company, then by its values, its culture and its size.

Concerning the use of AI in employee training, it has become a practice that spread throughout organizations allowing HR managers to organize and develop customized training programs suitable for all talents and skills. Moreover, authors (P. Matsa and K. Gullamaji, 2019) also consider that AI based learning programs are more effective than traditional programs.

Thus, our study reveals an absence of AI use in training, as all the companies we met only opt for traditional training or e-learning. Moreover, even if the HR managers interviewed are interested in integrating AI in their training process in the future because of the advantages offered, they prefer to couple this with a hybrid learning model combining traditional training centered on human presence as well as those based on AI. We conclude that the field in Morocco is still fertile for the deployment of AI in training, starting first with the awareness of HR managers about the importance of its deployment, and then with the adoption of concrete tools allowing the development of managers' skills.

Regarding the fourth HR dimension studied, namely management of performance, the literature considers the employee evaluation method based on AI easier, faster and more efficient.

Indeed, by analyzing several data collected from a set of sources such as access control systems, sensors integrated in smart devices, GPS... etc, AI will be able to analyze the behavior of employees with their professional environment, follow their movements, measure the satisfaction of customers and that of supervisors. As such, we observe the same application in the companies studied, which confirms that AI now occupies an important place in the performance management system, since it is used not only to manage the productivity and performance of employees but also to ensure an objective evaluation of employees.

Then, we move to compensation management which, according to the literature, would be more reliable and fair by adopting electronic compensation programs based on AI as well as using the neural network system. On the other hand, AI is not used in compensation by the companies we have met because they want to keep a certain human control over this strategic HR function. They therefore limit themselves to automating the compensation management process, using digital platforms or software that are considered sufficient due to functional and financial reasons.

Finally, at the level of human relations management, authors (J. Qiong, 2018) and (Rio-Jeanne, 2019) assert that AI tools can be used in this HR dimension in order to observe behaviors between colleagues, detect signals of disengagement of employees or even organize meetings through a virtual assistant. According to the literature, AI technology allows a better HR management, improve the working conditions and also enhance the collaboration between colleagues.

In Morocco, the HR managers interviewed justify the absence of AI in the management of human relations by their attachment to human exchanges within the company. However, they express interest in using progressive deployment of this technology in the future, so as to manage the communication between company subsidiaries and also between employees, taking into consideration ethical rules as well as the employee's privacy. Nevertheless, AI is not currently deployed for human relations management, managers remain aware of the advantages that this technology can bring; hence, a partial application of it is expected in the future.

Conclusion: Limits and Perspectives

As a conclusion, regarding the application of Artificial Intelligence (AI) in the six aforementioned dimensions of Human Resources, several authors confirm that the use of AI (machine) supports decision-making processes through the analysis of big data collected by AI. This position is also confirmed by HR managers in Morocco who, in a logic of

complementarity, also wish to keep a human margin of maneuver on certain strategic HR aspects such as employee evaluation and human relations management.

Regarding recruitment, the literature mentions the use of AI for identifying vacant positions, sorting and selecting candidates. However, the results of the study show that organizations in Morocco have not yet implemented algorithms related to this function but are projecting adoption in the future to shorten recruitment times, standardize candidate selection criteria, and optimize costs.

The use of AI in training is recognized as a customized learning mode suitable for all talents, but on the ground, the results show a low mobilization of this technology in this dimension. Finally, the deployment of AI in performance management through data analysis is considered faster and more efficient, and its implementation in this area is observed in our field.

In summary, the use of AI in HR depends on several factors, namely digital maturity, values, culture, and the size of a company. Indeed, the results of our study reveal that the pushed and accelerated digital transformation in companies in Morocco remains an essential condition for a concrete deployment of AI. This digital mutation must mainly respond to social and cultural issues at the HR management level, hence the need to train, accompany, involve, and rally employees around AI to avoid the resistance observed in some companies and achieve operational excellence while respecting employees' values and privacy.

Our study, whose objective was to identify the place of AI in management tools dedicated to HR in Morocco, was not without limitations. A first limitation raised during our research is linked to the qualitative approach followed and based on semi-structured interviews targeting only HR managers. We believe that in the future, it would also be interesting to know the perception of employees, as key actors in this real or future implementation of AI in companies. The second limitation of this work lies in the fact that this research is cross-sectional. Indeed, although our study was able to identify the concept of AI and specify the degree of its implementation in the Moroccan organization, as shown by its results, due to the lack of use of AI in several HR processes of the organization, it would be more enriching to conduct a longitudinal research to observe the progression of its application in Morocco, a fertile ground for the deployment of this new technology.

Bibliographic references

- Abraham, M., Niessen, C., Schnabel, C., Lorek, K., Grimm, V., Moslein, K., & Wrede, M. (2019), “Electronic monitoring at work: The role of attitudes, functions, and perceived control for the acceptance of tracking technologies“, *Human Resource Management Journal*, 29(4), 657–675. <https://doi.org/10.1111/1748-8583.12250>
- Ancarani, A., Di Mauro, C., & Mascali, F. (2019), “Backshoring strategy and the adoption of Industry 4.0: Evidence from Europe“, *Journal of World Business*, 54(4), 360–371. <https://doi.org/10.1016/j.jwb.2019.04.003>
- Araujo, T. (2018), “Living up to the chatbot hype: The influence of anthropomorphic design cues and communicative agency framing on conversational agent and company perceptions“, *Computers in Human Behavior*, 85, 183–189. <https://doi.org/10.1016/j.chb.2018.03.051>
- Aloisi, A. et Gramano, E. (2019), « Artificial intelligence is watching you at work: Digital surveillance, employee monitoring, and regulatory issues in the EU context”, *Comparative Labor Law & Policy Journal*, « Automation, Artificial Intelligence and Labour Protection» [numéro thématique], édité par Valerio De Stefano, 41(1), 95-121.
- Barboza, C. (2019), “Artificial Intelligence and HR: The new wave of technology”, *Journal of Advances in Social Science and Humanities*, 5(4), 715–720. <https://doi.org/10.15520/jassh54429>
- Bondarouk, T., Harms, R., & Lepak, D. (2017), “Does e-HRM lead to better HRM service ?“, *The International Journal of Human Resource Management*, 28(9), 1332–1362. <https://doi.org/10.1080/09585192.2015.1118139>
- Bailie, I. and Butler, M.M., 2018. An examination of artificial intelligence and its impact on human resources.
- Bapna, R., & Gupta, A. (2019). Artificial Intelligence and Human Resources: The Need for Ethical Consideration. *Journal of Business Ethics*, 160(3), 791-799.
- Blaschke, S. (2017). Artificial intelligence and its implications for HR strategy and practice. *Human Resource Management Review*, 27(3), 431-436.
- Colbert, A., Yee, N., & George, G. (2016), “The digital workforce and the workplace of the future“, *Academy of Management Journal*, 59(3), 731–739. <https://doi.org/10.5465/amj.2016.4003>
- Cooke, F. L., Wood, G., Wang, M., & Veen, A. (2019), “How far has international HRM travelled? A systematic review of literature on multinational corporations (2000–2014)“, *Human Resource Management Review*, 29(1), 59–75. <https://doi.org/10.1016/j.hrmr.2018.05.001>
- CEST, 2019 Commission de l'éthique en science et en technologie (CEST) (2019), “Les effets de l'intelligence artificielle sur le monde du travail”, Document de réflexion. Québec.
- Di Iorio, N. (2020), “La gestion des ressources humaines à l'ère de l'intelligence artificielle. Ordre des conseillers en ressources humaines “. <https://ordrecrha.org/ressources/technologies/2020/01/gestion-ressources-humaines-ereintelligence-artificielle>
- Go, E. J., & Sundar, S. S. (2019). When bots talk: Communicating with robots as a function of robot language level, media richness, and human agency. *Journal of Computer-Mediated Communication*, 24(2), 62-77.
- Goldstein, I. L., & Ford, J. K. (2002), “Training in organizations: Needs assessment, development, and evaluation“, (4th ed.). Belmont, CA: Wadsworth.

- Hutson, M. (2017). Even artificial intelligence can acquire biases against race and gender. *Scientific journal new york* 37, 14-16.
- Henderson, R. I. (2003). *Compensation management in a knowledge-based world*. Pearson Education.
- Huang, L., Hu, Y., & Davison, R. M. (2018). A Review of the Applications of Artificial Intelligence in Human Resource Management. *Decision Support Systems*, 114, 1-9. <https://doi.org/10.1016/j.dss.2018.08.004>
- Hennebert, M.-A. et Bourguignon, R. (2021), “La gestion des ressources humaines à l’ère numérique : Occasion stratégique ou risque de marginalisation ?”, Dans J. Bernier, *L’intelligence artificielle et les mondes du travail. Perspectives sociojuridiques et enjeux éthiques* (99-122). Presses de l’Université Laval.
- Islam, M., Mamun, A. A., Afrin, S., Ali Quaasar, G. M. A., & Uddin, Md. A. (2022), “Technology Adoption and Human Resource Management Practices: The Use of Artificial Intelligence for Recruitment in Bangladesh”, *South Asian Journal of Human Resources Management*, 9(2), 324–349. <https://doi.org/10.1177/23220937221122329>
- Jain, A. K., & Li, S. Z. (2011), “Handbook of face recognition”, New York, MA: Springer.
- Jia, Qiong; Guo, Yue; Li, Rong; Li, Yurong; and Chen, Yuwei, “A Conceptual Artificial Intelligence Application Framework in Human Resource Management”; (2018). *ICEB 2018 Proceedings*. 91.
- Kathleen S. Hornsby et al. - Dans leur article "Artificial Intelligence in HR: The Future of Workforce Management" (2018)
- Kooij, D. T., van Woerkom, M., Wilkenloh, J., Dorenbosch, L., & Denissen, J. J. (2020). Job crafting towards strengths and interests: The effects of a job crafting intervention on person–job fit and the role of age. *Journal of Vocational Behavior*, 119, 103428.
- Lambrecht, A., & Tucker, C. (2019), “Algorithmic bias? An empirical study of apparent gender based discrimination in the display of stem career ads”, *Management Science*, 65(7), 2966–2981. <https://doi.org/10.1287/mnsc.2018.3093>
- Lariviere, B., Bowen, D., Andreassen, T. W., Kunz, W., Sirianni, N. J., Voss, C., Wunderlich, N. V., & De Keyser, A. (2017), “Service Encounter 2.0: An investigation into the roles of technology, employees and customers”, *Journal of Business Research*, 79, 238–246. <https://doi.org/10.1016/j.jbusres.2017.03.008>
- Lee, I. (2011), “Modeling the benefit of e-recruiting process integration”, *Decision Support Systems*, 51(1), 230–239. <https://doi.org/10.1016/j.dss.2010.12.011>
- Lisa, A. K., & Talla Simo, V. R. (2021), “An in-depth study on the stages of AI in recruitment process of HRM and attitudes of recruiters and recruits towards AI in Sweden”, (master’s thesis), Umea University, Sweden. <http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-184521>
- Lapointe, É., & Rivard, S. (2020). The financial impact of artificial intelligence on HRM: An empirical study. *International Journal of Information Management*, 50, 222-233.
- Luo, Y., Huang, L., Liu, S., & Du, J. (2019). AI in HRM: From transformation to reinvention. *IEEE Engineering Management Review*, 47(4), 101-109.
- Lengnick-Hall, M. L., Neely, A. R. et Stone, C. B. (2018). “Human resource management in the digital age: Big data, HR analytics and artificial intelligence. Dans P. N. Melo et C. Machado, *Management and technological challenges in the digital age* (1-30). CRC Press.
- Malik, A., Budhwar, P., Srikanth, N. R., Varma, A. (2019), “May the Bots Be with You! Opportunities and Challenges of Artificial Intelligence for Rethinking Human Resource

Management Practices“, Paper Accepted for presentation BAM 2019. https://www.bam.ac.uk/sites/bam.ac.uk/files/contribution294_0.pdf

- Marler, J. H., & Parry, E. (2016). Human resource management, technology and innovation: New challenges and opportunities. Routledge.
- Maity, S. (2019), “Identifying opportunities for artificial intelligence in the evolution of training and development practices“, *Journal of Management Development*, 38(8), 651–663. <https://doi.org/10.1108/JMD-03-2019-0069>
- Meijerink, J., Boons, M., Keegan, A. et Marler, J. (2021), “Algorithmic human resource management: Synthesizing developments and cross-disciplinary insights on digital HRM”, *The International Journal of Human Resource Management*, 32(12), 1-18.
- Noe, R., Hollenbeck, J., Gerhart, B., & Wright, P. (2006), “Human Resources Management: Gaining a Competitive Advantage“, Tenth Global Edition. New York, MA: McGraw-Hill Education.
- Nobre, R. M. S. (2020), “How Artificial Intelligence Can Provide Support in Project Resource Management. Master Thesis of Science in Business Administration”, Instituto Universitario de Lisboa.
- Otley, D. (1999). Performance management: A framework for management control systems research. *Management Accounting Research*, 10(4), 363-382.
- Parry, E., & Tyson, S. (2011). Desired goals and actual outcomes of performance appraisal feedback. *Personnel Review*, 40(2), 217-232.
- P. Matsa, K. Gullamajji, “To study impact of artificial intelligence on Human Resource Management“, *International Research Journal of Engineering and Technology (IRJET)*, 6 (8) (2019), pp. 1231-1238
- Ransbotham, S., Kiron, D., Gerbert, P., & Reeves, M. (2017), “Reshaping business with artificial intelligence: Closing the gap between ambition and action“. *MIT Sloan Management Review*, 59(1), 1–17.
- Rio-Jeanne, V. (2019), “Ce que l’intelligence artificielle va changer pour les managers. Harvard Business Review France”. <https://www.hbrfrance.fr/chroniques-experts/2019/01/23992-ce-que-lintelligenceartificielle-va-changer-dans-la-fonction-de-manager/>
- Richard, M.A., & Lippmann, R.P. (1991). Neural network classifiers estimate Bayesian a posteriori probability. *Neural Computation*, 3(4), 461-483.
- Rivard, P. et Lauzier, M., 2013, “Gestion de la formation et du développement des ressources humaines“, 2e éd, Presses de L’Université DU Québec (PUQ), ISBN:9782760526105
- Suen, H. Y., Chen, M. Y. C., & Lu, S. H. (2019), “Does the use of synchrony and artificial intelligence in video interviews affect interview ratings and applicant attitudes ? “, *Computers in Human Behavior*, 98, 93–101. <https://doi.org/10.1016/j.chb.2019.04.012>
- Sekerin, V. D., Gaisina, L. M., Shutov, N. V., Abdrakhmanov, N. K., & Valitova, N. E. (2018), “Improving the quality of competence-oriented training of personnel at industrial enterprises“. *Calitatea*, 19(165), 68–72.
- Sima, V., Gheorghe, I. G., Subić, J., & Nancu, D. (2020), “Influences of the industry 4.0 revolution on the human capital development and consumer behavior: A systematic review“, *Sustainability*, 12(10), 1–28. <https://doi.org/10.3390/su12104035>
- Swanson et Holton, 2001, “foundations of human resource development“, Berrett-Koehler Publishers Inc San Francisco, ISBN: 9781576750759

- Thomaz, A. L., Hoffman, G., & Mojtahedi, M. (2020). Robotic service and human enhancement: Opportunities, pitfalls, and governance. *Journal of Business Research*, 118, 1-13.
- Tambe, P., Cappelli, P., & Yakubovich, V. (2019), “Artificial intelligence in human resources management: Challenges and a path forward“, *California Management Review*, 61(4), 15– 42. <https://doi.org/10.1177/0008125619867910>
- Van Esch, P., Wester, F., & de Lange-Ros, M. (2019). Investigating the effects of robot recruiters: A video-based exploratory study. *Journal of Business Research*, 104, 328-337.
- Veale, M. et Brass, I. (2019), “Administration by Algorithm ? Public Management Meets Public Sector Machine Learning, Dept. of Science, Technology, Engineering & Public Policy“, University College London Birmingham Law School, University of Birmingham.
- Wang, D., Liang, H., & Zhao, J. (2020). Artificial Intelligence in Human Resource Management: Challenges and Opportunities. *International Journal of Human Resource Management*, 31(22), 2864-2885.
- Wamba-Taguimdje, S.-L., Fosso Wamba, S., Kala Kamdjoug, J. R., & Tchatchouang Wanko, C. E. (2020), “Influence of artificial intelligence (AI) on firm performance: The business value of AI-based transformation projects”, *Business Process Management Journal*, 26(7), 1893– 1924. <https://doi.org/10.1108/BPMJ-10-2019-0411>
- Wang, T., & Lin, J. (2020, April), “Research on teaching reform and work innovation of HRM driven by AI”, In 2020 International Conference on Big Data and Informatization Education (ICBDIE) (pp. 1–4). IEEE.
- Wolor, C. W., Khairunnisa, H., & Purwana, D. (2020),” Implementation talent management to improve organization’s performance in Indonesia to fight Industrial Revolution 4.0”, *International Journal of Scientific & Technology Research*, 9(1), 1243–1247.
- Zheng, X., & Li, H. (2020). The impact of artificial intelligence on human resource management: Challenges and opportunities. *Journal of Business Research*, 116, 229-237. <https://doi.org/10.1016/j.jbusres.2020.06.010>