Artificial Intelligence and Human Resources: innovative trends and main impacts

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Abstract

Objective: This dissertation aims to explore how innovative AI-based solutions are reshaping HR processes and understand how they impact organizations. To achieve this goal, the research investigates emerging trends in the international landscape and assesses the status of implementation of these solutions by Italian organizations.

Scope and metodology: This dissertation presents a mapping of international startups offering advanced AI technologies for HR processes to identify key market trends. Moreover, it reports the results of interviews conducted with Italian companies to provide a deeper understanding of the practical benefits and challenges associated with the adoption of AI-driven HR practices. To ensure an adequate analysis of the current state of the art, the dissertation focused on three macro processes, which are further composed of other processes. The first macro process identified is *Attraction*, which includes *Employer Branding*, *Recruitment*, and *Selection*. The second is *Learning & Development*, which involves *Career Growth*, *Feedback Management*, and *Training*. Lastly, there is *Well-Being*, which includes *Employee Well-Being*.

To perform the aforementioned analysis, two frameworks were utilized: initially, the classification of AI technologies made by the Artificial Intelligence Observatory of the Politecnico di Milano was followed, after which a more specific and detailed grouping was defined to categorize solutions according to the needs they were addressing.

Findings and conclusions: The frameworks were then used to analyze the innovation trends emerged form the international startups mapping. From this analysis, new families of solutions were identified and integrated into the framework to update it and it was then used to classify the results emerged form the interview. They were conducted with the aim to comprehend the state of adoption AI technologies in HR functions for large Italian organization that are operating in various sectors that are at the forefront of HR innovation. This made it possible to assess which benefits and challenges companies are facing during the implementation of these technologies, and eventually, a comparison of the trends emerging from both objectives of the research was consolidated.

Limitations and future developements: One of the primary challenges identified in

this study was the use of a restricted sample of startups, which led to insufficient data for certain evaluations, limiting the ability to derive meaningful conclusions. A similar limitation affected the portfolio of organizations interviewed: although the sample was multisectoral, it lacked diversity in terms of company size. To overcome these challenges, expanding the number of databases used to source startups and diversifying the sample of companies interviewed would be advantageous.

Abstract in lingua italiana

Obiettivo: Questa tesi si propone di esplorare come le soluzioni innovative basate sull'intelligenza artificiale stiano ridisegnando i processi HR e di comprendere il loro impatto sulle organizzazioni. Per raggiungere questo obiettivo, la ricerca indaga le tendenze emergenti nel panorama internazionale e valuta lo stato di implementazione di queste soluzioni da parte delle organizzazioni italiane.

Estensione e metodologia: La tesi presenta una mappatura delle startup internazionali che offrono tecnologie avanzate di AI per i processi HR, al fine di identificare i principali trend di mercato. Inoltre, riporta i risultati di interviste condotte con aziende italiane per fornire una comprensione più approfondita dei benefici pratici e delle sfide associate all'adozione di pratiche HR guidate dall'IA. Per garantire un'analisi adeguata dell'attuale stato dell'arte, la tesi si è concentrata su tre macro processi, che sono ulteriormente composti da altri processi. Il primo macro processo individuato è l'Attrazione, che comprende *Employer Branding*, Reclutamento e Selezione. Il secondo è l'Apprendimento e sviluppo, che comprende la crescita della carriera, la gestione dei feedback e la formazione. Infine, c'è il benessere, che comprende il benessere dei dipendenti. Per effettuare la suddetta analisi, sono stati utilizzati due framework: inizialmente è stata seguita la classificazione delle tecnologie di IA effettuata dall'Osservatorio sull'Intelligenza Artificiale del Politecnico di Milano, dopodiché è stato definito un raggruppamento più specifico e dettagliato per categorizzare le soluzioni in base alle esigenze a cui rispondevano.

Risultati e conclusioni: I framework sono stati poi utilizzati per analizzare i trend di innovazione emersi dalla mappatura delle startup internazionali. Da questa analisi sono state identificate nuove famiglie di soluzioni che sono state integrate nel framework per aggiornarlo ed è stato poi utilizzato per classificare i risultati emersi dalle interviste. Queste ultime sono state condotte con l'obiettivo di comprendere lo stato di adozione delle tecnologie AI nelle funzioni HR di grandi organizzazioni italiane che operano in diversi settori all'avanguardia nell'innovazione delle risorse umane. In questo modo è stato possibile valutare quali benefici e quali sfide le aziende stanno affrontando durante l'implementazione di queste tecnologie e, infine, è stato consolidato un confronto tra le tendenze emerse da entrambi gli obiettivi della ricerca.

Limitazioni e sviluppi futuri: Una delle sfide principali identificate in questo studio è stato l'utilizzo di un campione ristretto di startup, che ha portato a dati insufficienti per alcune valutazioni, limitando la capacità di trarre conclusioni significative. Una limitazione simile ha riguardato il portafoglio di organizzazioni intervistate: sebbene il campione fosse multisettoriale, mancava di diversità in termini di dimensioni aziendali. Per superare queste sfide, sarebbe vantaggioso ampliare il numero di database utilizzati per reperire le startup e diversificare il campione di aziende intervistate.

Parole chiave: Intelligenza Artificiale, Risorse Umane, adozione AI, sfide AI, processi HR, trend di innovazione, startup, attrazione, apprendimento e sviluppo, benessere.

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1. Introduction

What would be the impact on Human Resources (HR) if Artificial Intelligence (AI) were to be used to resolve every critical aspect of the process? The advent of innovative AI-based tools signals the beginning of a new era for the Human Resources sector. This era will be defined by advanced automation, predictive analytics, and optimized decision-making processes. AI-driven technologies have the potential to transform training, recruitment, or even revolutionize employee well-being.

In this context, individuals would have the opportunity to invest more time in personal growth, acquiring new skills, and finding innovative solutions to global problems, freeing themselves from routine and repetitive tasks that currently consume much of their energy. In the current business environment, organizations are facing significant challenges. AI has the potential to address these challenges in a way that is more efficient and effective. For example, AI can be used to connect with the right talent, promote growth and development within organizations, and create an environment that fosters personal well-being and satisfaction.

Today, AI is already being used to simplify many aspects of Human Resource Management, such as resume analysis, candidate selection, performance management, and training. The AI revolution is advancing at such a rapid and disruptive pace that predicting its future developments is nearly impossible; what is clear, however, is that we are only at the beginning of this transformation.

2. Objective

This dissertation aims to investigate what are the innovative trends in the international market and the impact of innovative solutions based on Artificial Intelligence applied to Human Resources processes, with a particular focus on their implementation in organizational contexts. To achieve this goal, the research examines emerging trends in the international startup landscape and assesses the state of implementation of these solutions by Italian organizations. The objective of this research is indeed twofold: to provide an overview of the innovations taking place and to stimulate informed thinking about how to approach the future of work.

3. Literature review

To address the objective of the research, the first step was a review of the fundamental literature on the topics of Human Resources and Artificial Intelligence, two areas that are increasingly converging. The review first explores the evolution of HR from a purely administrative function to a strategic pillar with a key role in connecting top management and employees. Indeed, modern HR is responsible for translating the strategic goals defined by leadership into concrete actions aimed at employees, thus promoting alignment between corporate strategies and individual goals. This connecting role is accomplished through a variety of processes, such as recruitment, training, professional development, compensation management, and promotion of organizational well-being. The goal is to create an environment that enhances talent and supports the long-term growth of the company, contributing not only to productivity but also to building a strong and inclusive corporate culture [2].

The HR sector is now facing unprecedented challenges that are closely linked to the profound changes in the world of work, society, and technology. Among these challenges is the management of diversity and inclusion, which requires overcoming entrenched biases and promoting cultural change in the company [13]. Another crucial challenge is digital transformation, which not only requires the adoption of innovative tools such as AI and big data, but also a rethinking of how HR operates, toward more data-driven and personalization-oriented approaches. In parallel, the expectations of workers are also changing, especially Millennials and Generation Z, who place high value on flexibility, remote working, and the opportunity to contribute to social causes through their work [10]. This increase in expectations requires HR departments to create environments that meet these needs while ensuring alignment with strategic business objectives. These challenges are compounded by complex phenomena such as Talent Shortage, the growing skills shortage, which is particularly critical in technology sectors, where demand for specialized skills exceeds supply. This creates difficulties for companies in competing to attract and retain key talent for their growth and innovation strategies [3]. Moreover, the phenomenon of Great Resignations highlights how

physical and mental well-being has become a determining factor in career choices: 36 percent of workers who leave their jobs do so for reasons related to personal well-being [9].

In this scenario, the need for reskilling and upskilling emerges: organizations need to update and expand the skills of their employees to respond to digital transformation. Reskilling enables workers to prepare for new emerging roles through automation, while upskilling aims to enhance existing skills by adapting them to the new requirements introduced by AI integration [5]. Today, it is no longer enough to offer a competitive salary; workers increasingly seek opportunities for personal growth, well-being, and work environments that reflect their values [9].

In this context of change and new demands, Artificial Intelligence is emerging as a strategic support for HR, enabling more efficient and targeted talent management. In fact, AI represents one of the most transformative innovations of our time, with significant impact on a wide range of industries and applications. In 2024, AI adoption reached 72 percent of organizations globally, marking a substantial increase from previous years when adoption hovered around 50 percent for several consecutive years [14]. This rapid increase has been largely catalyzed by the rise of generative Artificial Intelligence, which has seen meteoric growth due to its versatility, scalability, and ease of use [4].

However, despite the promises of efficiency and progress, AI carries a number of downsides that raise important ethical, social, and technical questions. One of the most significant negative aspects of AI concerns growing economic inequality. AI solutions, particularly those related to machine learning and automation, have the potential to dramatically reduce operational costs and increase productivity. However, these benefits are not distributed equally. Large enterprises with significant resources are able to invest heavily in AI, gaining substantial competitive advantages over SMEs. Another issue, again related to the massive amount of data required in the AI creation and development process, concerns privacy. Indeed, algorithms often collect sensitive personal information whose storage and analysis poses serious risks to the privacy of individuals. These breaches can result from both cyber attacks and the misuse of

data by the organizations collecting it, such as in the case of the use of copyrighted data for training LLMs [7]. In this context, an autonomous cause AI system also has the potential to make mistakes and cause harm making the issue of accountability also of primary importance, as decisions made by AI could be the result of complex processes that are not directly controllable or predictable by humans [16].

After exploring the context of Human Resources and Artificial Intelligence, the literature related to the integration of these two areas was analyzed, with a focus on the possible applications of AI in Human Resource Management. AI can be employed at all stages of the employee lifecycle, from screening CVs and suggesting best fits against the Job Description or for skills analysis and proposing customized training paths to decisions on career advancement [1] [11]. It is revolutionizing Human Resource Management by improving the efficiency and quality of decisions. Among its main benefits, AI enables rapid analysis of large volumes of data, supporting agile and accurate strategic decisions, reducing bias in selection and promotion processes, and promoting equity and inclusion. In addition, automation of repetitive tasks allows HR staff to focus on higher value-added tasks [15].

However, the adoption of AI in HR presents significant challenges, including the risk of algorithmic bias, which could perpetuate biases present in historical data, and privacy issues related to the collection of sensitive employee data. The decision-making complexity of AI systems can undermine employee trust, while AI's limitations in understanding interpersonal dynamics still require human involvement for decisions that need empathy and emotional intelligence [8] [12].

4. Methodology

The literature review revealed a study context characterized by a high degree of innovation and rapid and constant evolution, making a comprehensive treatment of the most recent developments in the application of Artificial Intelligence to Human Resource Management processes complex. Moreover, the existing literature is not very comprehensive, focusing mainly on international contexts and lacking adequate tools to measure the impact of AI on business

performance in HR, as many organizations do not adopt specific and appropriate metrics.

Based on these observations, the following research objective was formulated:

Research Objective (RO): *Examine the state of the art of innovative AI-based solutions applied to Human Resource processes and evaluate their impact within Italian organizations.*

This objective was further specified through the following research questions:

Research Question 1 (RQ1): *What are the innovative trends in the international market for AI-based solutions applied in the HR processes?*

Research Question 2 (RQ2): *What are the impacts of the implementation of AI-based solutions on Human Resource processes within Italian organizations and what are the main barriers to their effective adoption?*

Initially, the boundaries of the research were defined. Geographically, an international analysis was conducted to answer RQ1, followed by an in-depth study specifically on the Italian context to answer RQ2. In terms of the study focus, specific processes recognized in the literature as the most emergent and relevant were selected to cover the key aspects of the employee life cycle within the organization, encompassing entry into the company, professional development, and well-being conditions affecting retention. These three areas, referred to as macro-processes, have been classified as *Attraction*, *Learning & Development*, and *Well-Being*, and analyzed in depth to identify their key processes.

The *Attraction* macro process includes *Employer Branding*, aimed at promoting corporate image to attract talent; *Recruitment*, dedicated to finding qualified candidates; and *Selection*, which evaluates candidates to identify the most suitable profiles. In the Learning and Development macro process, the main processes include *Career Growth*, which aims to create opportunities for career advancement and development; *Feedback Management*, geared toward collecting feedback to support performance improvement; and *Training*, which aims to provide training paths for employee skill development. Finally, *Well-Being* focuses on the *Employee Well-Being* process, aimed at promoting the physical and psychological well-being of employees.

Two frameworks were the pillars of this study. The first, provided by the Artificial Intelligence

Observatory of the Politecnico di Milano, classifies AI solutions into five categories: *Generative AI, Recommendation Systems, Text Analysis, Image & Video Analysis*, and *Data Exploration*. The second framework, built specifically for analyzing the state of the global supply of AI solutions in HR, led to the definition of a two-stage taxonomy. In the first phase, an exhaustive list of AI solutions in use globally was compiled from a Google search through word strings that called out macro processes and processes of interest. In the second phase, the solutions were organized into AI Solution Families, each associated with a specific AI category, resulting in a structured taxonomy with nine families for the *Attraction* macro process, ten for *Learning & Development*, and three for *Well-Being*, with eight based on *Generative AI*, five on *Data Exploration*, one on *Image & Video Analysis*, six on *Recommendation Systems*, and two on *Text Analysis*.

The methodology included two main lines of analysis. The first focused on analyzing the offerings proposed by international startups to answer RQ1, focusing on AI solutions for Human Resources to identify the state of the art and innovative trends both globally and domestically, thus answering the first research question. The second line of analysis adopted a qualitative approach through interviews to examine the impacts of AI solution adoption in HR processes of Italian organizations and identify the main barriers to their implementation.

In the first phase, a dataset from Crunchbase was integrated with a dataset of Italian startups provided by the Startup & Scaleup Hi-Tech Observatory of the Politecnico di Milano. Startups that fit the research criteria were selected, resulting in a sample of 217 startups, of which 22 were Italian. General and financial information was collected for each startup, and each was mapped to the macro-process, specific process, AI category, and AI solution family of the framework. If the technology provided by a startup did not fit into any of the pre-existing AI solution families in the framework, a new family was created.

Next, the state of the art of startups in the dataset was analyzed, considering the period 2020-2023 for trend analysis. This time interval, chosen for its consistency and relevance, allows the identification of emerging solutions and evolutions in the industry. 2019 was excluded to ensure a uniform four-year time frame, while 2024 was omitted due to incomplete data.

The second phase involved conducting interviews with a selected sample of companies in order to investigate the impacts of adopting AI-based solutions in Human Resource Management processes in Italian organizations and identify the main barriers to effective implementation, thus answering the second research question. To adequately prepare this phase, a preliminary analysis was conducted based on data collected by the HR Innovation Practice Observatory of the Politecnico di Milano and reported for the two-year period 2023-2024, which provide a detailed overview of the adoption of AI technologies in HR practices in Italy.

Companies to be interviewed were selected through a survey of case studies published on the websites of the vendors identified in the framework, with explicit mention of the use of AI in their proposed solutions. Companies were chosen following three main criteria: sectoral heterogeneity, exhaustive coverage of the HR processes described, and availability of contacts for direct access to interviews.

A total of seven companies were interviewed, a sample considered adequate according to an article, who found that most themes emerge within the first six to twelve interviews, with new themes becoming increasingly rare beyond that number. The selected companies include Cimbali Group, Medtronic, Sace, Vodafone, and three other international organizations that remained anonymous (Company 1, Company 2, and Company 3), all of which have a turnover of more than €1 billion in 2023. As pointed out by the article, a homogeneous sample facilitates the achievement of theoretical saturation, as the selected companies share characteristics that make them particularly well suited for an in-depth discussion on the implementation of advanced technology solutions [6].

During the interviews, the AI technologies used by the companies were explored, how and how often they measure impacts, as well as the benefits and critical issues encountered in adoption. To further explore the impacts, it was specifically asked whether the KPIs identified in the literature were being adopted.

5.   Findings

The study of startups offering AI-based solutions for the Human Resources sector was conducted with the aim of identifying the main innovative trends internationally. The initial analysis focused on the distribution of the sample in terms of the number of startups and financial metrics such as total funding received and the size of the last round of funding obtained. This phase provided a preliminary view of the context and formed the basis for the more in-depth assessment of trends. A comparison between the 2020-2021 and 2022-2023 biennium was then conducted based on all elements of the frameworks used, identifying the categories of solutions that are increasing their relevance in the industry innovation landscape.

In parallel, interviews were conducted to assess the demand for AI solutions in the HR sector of Italian companies. The interviews with HR managers touched on various topics. First, the portfolio of AI-based solutions already implemented was analyzed, qualitatively assessing their benefits and critical issues. Next, managers were asked if, and what, KPIs they were using to objectively measure the impacts of these solutions. Finally, they were asked to describe the AI solutions being considered for the future, employees' approach to innovation, and the actions taken by HR management in response to these trends.

Valuable insights emerged from the interviews on general topics such as privacy, AI reliability, and the role of the HR function in innovation. However, in terms of assessing impacts, only a limited number of performance indicators could be collected, given the still experimental nature of AI implementation in the companies interviewed.

6.   Conclusions

Considering startups as innovation-driven organizations and often drivers of transformation in the industries in which they operate (Blank, 2013), the analysis of the data obtained from the mapping allows us to identify significant industry trends, thus answering RQ1. The analysis reveals a strong interest in the *Attraction* macro process, which is central to corporate strategies, particularly in a context in which filling vacant positions is increasingly complex due to

the shortage in the labor market of the skills most sought after by organizations. In recent years, there has also been a growing interest in *Employee Well-Being*, a phenomenon intensified by the pandemic, which has prompted companies to value quality of work life and work-life balance.

As for AI Observatory Classes, *Recommendation Systems* continue to play a central role, particularly in recruiting, to improve candidate-position matching; *Generative AI* has emerged as a leading technology, opening up new possibilities for automation and personalization. In contrast, *Image & Video Analysis* technologies show declining interest, especially in Europe, where restrictive regulations such as the AI Act limit their adoption.

The analysis of AI Solution Families confirms a strong global preference for *Candidate Recommendations Based on Job Offer Matching* solutions, which are still popular, but are progressively being joined by wellness-oriented solutions, such as *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* and *Platform for Creating New Well-Being Strategies*, reflecting the growing focus on wellness. In parallel, the rise of *Chatbots Based on Generative AI for Candidate Profiling and solutions for Automated Employee Support* highlights an interest in the use of *Generative AI*. These trends of interest are also reflected in funding, although a slowdown in investment is observed in recent years.

Complementing the analysis of global trends, interviews with HR managers from Italian companies provided relevant qualitative data on the experiences of Italian companies in adopting Artificial Intelligence solutions for HR processes, highlighting the types of solutions most adopted, concrete benefits obtained, difficulties encountered and future goals. Although the context is still exploratory, the interviews produced valuable findings to answer RQ2 regarding the main barriers and advantages in adopting these technologies: the first evidence that emerged is the objectification of decision-making, with AI that, if properly trained, can standardize processes and eliminate bias.

Second, Human Resources is seen as an increasingly strategic element, and HR managers believe that the HR function will have to take on

the role of change agent, promoting innovation at the enterprise level. AI security and reliability, especially in terms of data privacy and output accuracy, emerged as central issues, emphasizing the importance of keeping information confidential and reducing the risk of algorithm errors.

The joint analysis of the results shows a convergence between international startups and Italian companies in the adoption of AI solutions for HR, with a particular focus on the *Attraction* macro process, which includes *Employer Branding*, *Recruitment* and *Selection*, a trend confirmed both globally and domestically. The interviews also show that *Learning & Development* is one of the key areas for HR innovation in Italy, in line with what was observed in the study of Italian startups, demonstrating a convergence on the trends and importance of training and development. The *Well-Being* macro process is also gaining increasing relevance, albeit more limited than in other areas, due to post-pandemic workplace transformations and the push toward Employee Well-Being as a strategic investment.

Finally, the data show a similarity in the distribution of startups by AI classes compared to the Artificial Intelligence Observatory mapping, with a clear predominance of *Recommendation Systems*, accounting for 41 percent globally and 44 percent in the interviews. *Generative AI* and *Data Exploration* also show a similar distribution, indicating that, although at a preliminary stage, Italian companies are following global trends and are in line with other geographies.

The analysis of AI Solution Families shows significant common trends, with *Candidate Recommendations Based on Job Offer Matching* as the most represented solution globally and in interviews, and positive feedback for the innovative solution *AI-based support to increase efficiency in meetings*, confirming openness to advanced technologies in Italy as well.

Although this research has limited the analysis to three macro processes and seven specific processes, further areas of insight and development emerge. Processes such as Onboarding and Engagement, not analyzed here, could provide additional perspectives on AI adoption. The analysis of startups, currently limited by selective criteria and a lack of diversification in terms of company size, could be expanded to include a more heterogeneous and flexible sample in classifying the AI solutions used.

Finally, because the field is still at an exploratory stage, companies do not systematically evaluate the performance indicators of the AI solutions adopted: repeating this research in the future could therefore provide more accurate and complete data, allowing a clear picture of the potential impact of AI on HR processes and their strategic evolutions.

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Contents

1 | Introduction

It is possible to envision a future where Human Resources are no longer held back by complex processes, evaluation errors, or unconscious biases? What would happen if Artificial Intelligence, with its predictive and analytical capabilities, could resolve every critical aspect of recruitment, employee development, and talent management? Could technology truly come to unlock human potential, radically transforming the HR sector into an infallible ally for managers and employees alike? The challenge appears ambitious, but how close are we to this scenario in reality? With the advent of innovative AI-based tools, the Human Resources sector seems to be heading towards an era of profound renewal, characterized by advanced automation, predictive analytics, and optimized decision-making processes.

This seemingly utopian future extends well beyond the realm of Human Resources, touching other aspects like workplaces and social life. One could imagine a reality where AI not only facilitates business processes but also improves people's overall well-being, reducing inefficiencies and enable greater focus on creative and strategic activities. AI-driven technologies could transform education, making learning continuous and personalized, or revolutionize healthcare by personalizing treatment plans according to the specific needs of each individual. In this context, people could dedicate more time to personal growth, acquiring new skills, and finding innovative solutions to global problems, freeing themselves from routine and repetitive tasks that today consume much of their working energy. With increased AI support, employees' work could be transformed into higher-value activities, while the time dedicated to daily tasks would be reduced, allowing more space for continuous learning and the development of cross-functional skills. Artificial Intelligence, by automating administrative and operational tasks, would enable workers to focus on more rewarding and stimulating activities, while also promoting a better work-life balance.

Nowadays, organizations are facing some fundamental challenges like the inability to attract new resources but, with the help of AI, everything could be easier and more effective, even to connect with the right talents. Thanks to the use of advanced technologies based on Artificial Intelligence, companies are now able to optimize the way they present them-

selves to potential employees, reaching candidates that best reflect the organization's values and needs. Through data-driven tools, they can initiate more targeted and engaging communication, identifying more precisely the most suitable profiles and speeding up the selection process. For example, Artificial Intelligence systems are able to rapidly analyse a large number of applications, assessing skills, experience and aptitudes, and suggesting candidates with the best potential for success, thus helping to create cohesive and effective work teams.

Another key element concerns the ability to promote growth and development within organizations, a process that can be greatly enhanced by advanced technologies. Artificial Intelligence makes it possible to build customized learning paths that can be adapted to the specific needs of each individual. This means not only better feedback management, but also the possibility to create tailor-made growth opportunities that support career development in a dynamic and continuous way. For example, an AI-based system can analyse an employee's performance and suggest targeted training activities to fill any gaps or to foster the acquisition of new skills required by the market. Moreover, thanks to a constant analysis of individual and collective progress, a proactive approach to training can be adopted, encouraging both the development of technical and soft skills, such as the ability to work in a team, time management and adaptability. This type of support not only improves the effectiveness of development programs, but also provides employees with the motivation and resources they need to grow steadily and significantly.

An additional aspect to consider is the quality of life of employees and the creation of an environment that fosters personal well-being and satisfaction. Artificial Intelligence can be used to monitor working conditions by collecting and analyzing data on employees' satisfaction levels, preferences, and overall health. These insights make it possible to identify areas where the work experience can be improved, making the corporate environment more welcoming and stimulating. For example, by analyzing data on working hours, it is possible to suggest a better distribution of activities, avoid overload, and encourage more balanced time management. AI-based tools could also propose initiatives to improve work-life balance, such as flexible schedules, physical and mental wellness programs, or targeted recreational activities. In this way, AI becomes an ally in promoting overall well-being, helping to reduce stress, increase motivation, and ensure that each employee can reach his or her full potential in a more peaceful and productive work environment.

Today, the state of Artificial Intelligence as applied to HR processes and, more generally, to the world of work, is characterized by the increasing use of innovative tools capable of making business processes more efficient and improving the employee experience. AI is being used to simplify many aspects of Human Resource Management, such as resume

analysis, candidate selection, performance management and training. The main benefits that companies are already beginning to experience lie in the ability to automate repetitive tasks, reduce execution time, and improve decision accuracy through more precise and objective data analysis.

However, the use of Artificial Intelligence is not without its critical issues. One of the most discussed issues is that Artificial Intelligence is currently not yet sufficiently developed to completely replace human work. Algorithms require human oversight and intervention to ensure that decisions made are correct and error-free, especially in complex contexts such as Human Resource Management. Specialists must constantly monitor the work of AI to ensure high quality and prevent problems that might arise from misinterpretations of data.

In addition, a growing concern is the management of sensitive information. Many organizations are still reluctant to fully entrust critical processes to AI-based technologies because of the risk of data theft and potential privacy violations. This fear is well founded, as the storage and processing of personal data expose companies to vulnerabilities that could be exploited by malicious actors. Data security is therefore a crucial issue that requires investment in protective infrastructure and security protocols to reduce the risk of unauthorized access.

Another major challenge is employee resistance to the adoption of AI-based tools. This resistance is often motivated by lack of knowledge of the technology and fear of being replaced. Many workers perceive the introduction of AI as a threat to their job security, fearing that automation will reduce the need for human staff. This leads to an attitude of distrust and, in some cases, a refusal to use new tools. To overcome this resistance, it is critical to invest in training programs that help employees understand the added value of AI and develop the skills needed to collaborate with these technologies. Creating awareness of the idea that AI can be a tool that complements and enhances human capabilities, rather than a substitute, is essential to facilitate a smooth and productive transition.

This thesis is set in this transformational context, with the goal of exploring and understanding how innovative AI-based solutions are changing Human Resource processes, and what the actual impact of these technologies is within Italian organizations. The analysis focuses on how AI is helping to overcome challenges related to talent management, promote the growth and continuous development of staff, and improve employee well-being, seeking to paint a clear picture of the opportunities and transformations taking place. To do so, an approach was adopted to investigate, on the one hand, emerging trends in the

international landscape and, on the other, the direct experiences of Italian organizations that have implemented these solutions.

To answer these questions, it was necessary to explore both the innovative trends in the international market for AI solutions applied to Human Resources and the concrete impacts that these technologies are having within Italian organizations. In response to the first request, it was decided to proceed with a mapping of international start-ups offering advanced technology solutions, with the aim of identifying the main emerging trends in this area. On the other hand, to delve deeper into the reception that Italian companies are giving to AI-based solutions in their HR processes, direct experiences were gathered through qualitative interviews with organizations that have embarked on this path of innovation, with the aim of gaining a deeper understanding of both the benefits and challenges they have encountered.

The introduction of these technologies is only the first step in a much broader process of transformation that is reshaping the world of work and Human Resource Management. This change does not just improve current processes but lays the groundwork for a new vision of human-technology interaction, where AI becomes a tool to unlock human potential and foster a more productive work environment. It is therefore essential to fully understand the implications of this revolution, both in terms of opportunities and challenges. In the following chapters, these dynamics will be explored in detail, offering a critical and informed perspective on how Artificial Intelligence can improve HR processes. The goal is not only to provide an overview of the innovations taking place, but also to stimulate informed thinking about how to approach the future of work.

2 | Literature review

The second chapter of this thesis aims to analyse how HR and AI have evolved over time and how these two dimensions are progressively being integrated in the contemporary business environment. The review of relevant and updated academic literature helps to better understand the evolution of these fields, their mutual impact and the potential they offer in redefining the future of human capital management.

The chapter begins by exploring the development of Human Resources, from their traditional administrative role to their emergence as a crucial strategic lever for business success. The foundations of Human Resources management are examined, along with the growing challenges that arise in an increasingly complex and dynamic environment. In addition, emerging trends and the increasingly significant role of metrics and data in optimising personnel management practices are analysed.

Next, an overview of the evolution of Artificial Intelligence is presented, from its theoretical origins to its most modern and innovative applications. It investigates how AI has influenced different aspects of society and the economy, highlighting both the opportunities and risks associated with its adoption. Particular attention is paid to regulatory and governance issues, to highlight how these aspects can guide the use of AI in a responsible and sustainable manner.

The last part of the chapter focuses on the use of Artificial Intelligence in the field of Human Resources. The main areas of application and benefits of integrating AI into HR processes, such as personnel selection and recruitment, improving decision-making processes and optimising the employee experience, are analysed. At the same time, ethical and operational challenges related to the use of AI are addressed, with the aim of striking a balance between innovation and respect for human values.

This literature review provides a comprehensive view of how HR and AI can work together synergistically to promote profound change in human capital management. Through the analysis of relevant and up-to-date literature, the chapter aims to show how AI can be a strategic element to strengthen HR functions, without ever losing sight of the importance of ethical considerations and the human approach.

2.1.   The evolution of Human Resources

This section will demonstrate how the role of Human Resources has evolved from a primarily administrative function to a strategic pillar within organizations. In the context of ongoing technological innovation and rapid economic and social change, the role of HR has assumed a crucial importance for the long-term success of companies. In addition to personnel management, the contemporary role of HR encompasses the fostering of an inclusive corporate culture, the attraction and retention of talent, and the assurance of the development of the skills necessary to meet the challenges of the future.

2.1.1.   From administration to strategy

The field of Human Resources management has a long history, with roots tracing back to the coordination of work activities during the Industrial Revolution. At that time, the increasing complexity of labor relations and the expansion of companies called for a more structured approach to personnel management. Frederick Winslow Taylor, in his 1911 work, The Principles of Scientific Management, proposed the optimization of work processes through the implementation of a rigorous standardization of tasks and the application of scientific principles to work management. Although Taylor's approach was primarily concerned with operational efficiency and productivity, it marked the beginning of a formalization of personnel management, thereby laying the foundation for the evolution of Human Resources management.

During the early 20th century, HR functions were primarily administrative, focused on tasks such as payroll processing, recruiting, and labor regulatory compliance. This Taylorist model emphasized operational efficiency, but confined HR's role to an administrative support position, with little direct impact on strategic business decisions. However, beginning in the 1960s and 1970s, management theories began to change, recognizing human capital as a strategic resource. Elton Mayo's studies showed that improving working conditions and interpersonal relationships could have a direct impact on employee productivity. This shift in focus marked the beginning of a gradual shift toward management that was more focused on employee well-being and involvement.

In the 1980s and 1990s, concepts such as human capital and strategic Human Resource Management became central to business success. Gary Becker, with his theory of human capital, highlighted the importance of investing in the development of employee skills and capabilities as a crucial factor for long-term competitive advantage. In parallel, Michael Beer contributed to the evolution of Human Resources with his approach to strategic

management, emphasizing that HR policies had to be closely aligned with corporate vision and goals. This transformation led companies to recognize the importance of attracting, developing, and retaining talent, viewing them as a strategic lever for business success (Beer et al., 1984) (Burlui, 2024).

In recent decades, the strategic role of HR has become even more crucial due to rapid technological, economic, and social changes and to challenges such as managing diversity, equity and inclusion, digitization, and the adoption of emerging technologies, such as Artificial Intelligence, that are transforming the way HR operates. In addition, the growing importance of employee mental and physical well-being and employee experience has led companies to invest in work-life balance policies, mental health support programs, and employee engagement initiatives. New generations, such as Millennials and Generation Z, place a strong emphasis on these aspects, expecting work flexibility, work-life balance, and ethical alignment with corporate values (Smith, 2023) (Zielinski, 2023).

It is therefore becoming increasingly crucial to analyze the needs of workers and adapt company policies to keep the organization attractive, improving the overall well-being of employees and ensuring long-term success. These changes demonstrate how the role of Human Resources has evolved from a purely administrative function to a strategic component critical to organizational competitiveness (Westford University College, 2022).

2.1.2. The pillars of HR

HR occupies a key position within organizations by dealing with several fundamental activities that structure the entire employee lifecycle, from the talent attraction and selection phase to the introduction in companies, to the management of professional through learning and development programs and well-being initiatives. The main areas of focus for the HR function include:

Recruiting and personnel selection

Recruiting and personnel selection represent key activities for the HR department, with a direct impact on organizational performance and the company's overall competitiveness. In fact, the selection process involves more than simply evaluating applications; it involves several complex steps, all of which are essential to ensure that the resources selected are in line with the organization's strategic objectives. The process generally begins with a careful and thorough business needs analysis, that is, a detailed assessment of the skills and qualifications required for the role to be filled, and only from this preliminary stage can the organization structure a targeted and effective search.

Once the ideal profile is defined, the candidate attraction phase follows. In this context, a key element of modern recruiting is the implementation of a solid employer branding strategy that aims to build and promote a strong and attractive corporate image, aimed at positioning the company as an exciting and innovative place to work. Effective employer branding not only attracts top talent, but also affects staff retention, reducing turnover and improving the organizational climate. A strong corporate image and brand, therefore, increase the likelihood of attracting highly qualified, motivated candidates who are aligned with the corporate culture (Mosley, 2014).

In recent decades, however, the recruiting and selection process has become progressively more complex and sophisticated, in parallel with the development of digital technologies. Today, traditional selection tools, such as one-on-one interviews and competency assessments, are joined by advanced technological solutions that make the process more efficient and accurate. In particular, the use of Applicant Tracking Systems, also known as ATS, has spread significantly. ATSs are software that allow organizations to digitally manage the entire recruiting lifecycle, from the posting of the ad to the evaluation of candidates to the final integration of the new employee. These systems allow companies to automate many steps in the process, such as the initial screening of resumes and communication with candidates, significantly reducing selection time and ensuring greater accuracy in the initial assessment.

In addition to ATSs, social media platforms are playing an increasingly prominent role in candidate attraction and selection. Professional social networks such as LinkedIn allow companies to post job openings, proactively search for talent, and interact directly with potential candidates. These tools allow companies to expand their reach and reach more potential employees, including passive employees, those who are not actively seeking new employment but may be interested in new opportunities. The use of social media also makes it easier to build a network of professional contacts and increases corporate brand visibility.

However, the most innovative and disruptive aspect of the modern recruiting process is the increasing use of Artificial Intelligence and Machine Learning. These advanced technologies are revolutionizing the way HR manages recruiting, offering powerful tools that can analyze large amounts of data and provide valuable insights to identify the most suitable candidates. AI-based algorithms can, for example, review thousands of resumes in seconds, assess the match between candidates' skills and requirements, and even predict a candidate's likelihood of success for the role. This process can reduces selection time and improves the quality of hiring by eliminating cognitive bias and subjectivity, increasing the accuracy and objectivity of assessments (Chamorro-Premuzic et al., 2017).

Another key aspect of the use of AI in recruiting concerns the personalization of the candidate's experience. AI tools can analyze candidates' interactions with the company, through websites, social media, emails, and interviews, and personalize the recruiting process based on their preferences and behaviors.

The integration of advanced technologies such as AI and Machine Learning is thus transforming recruiting into a highly automated process that enables organizations to save time, improve selection accuracy, and attract top talent. However, despite the benefits offered by these technologies, it is important that organizations balance the use of digital tools with a human approach. The adoption of these technologies should not replace human judgment, but rather enhance it, allowing HR professionals to focus on more value-added activities, such as soft skills analysis and cultural assessment of candidates, aspects that are unlikely to be effectively automated (Parry and Wilson, 2009).

Training and development

In an ever-changing work environment of rapid technological and social change, it becomes essential for companies to invest in the continuous development of their human capital. Maintaining a workforce that is competitive and aligned with market needs requires an ongoing commitment to skills enhancement, both technical and soft skills. Technical skills relate to those specific abilities needed to perform certain tasks, such as the use of advanced tools and technologies, while soft skills-such as problem-solving, time management and collaboration-are becoming increasingly crucial to cope with dynamic and changing work environments.

A highly relevant element in the modern corporate training landscape is the personalization of learning programs. Training needs are no longer homogeneous, but vary significantly according to the position held, personal aspirations and specific needs of each employee. It is therefore crucial for companies to understand both organizational and individual needs in depth in order to design development paths in line with the company's strategic goals and the professional ambitions of individual workers. This customized approach not only allows for more targeted training to be provided, but also improves employee engagement and motivation, who perceive a real investment in developing their skills. When training programs are aligned with individual aspirations, there is a significant increase in job satisfaction, resulting in positive effects on overall organizational performance (Cascio, 2018).

In addition, customizing training programs has the added benefit of speeding up the process of acquiring specific skills. While a standardized training approach might be scattered or ineffective for some employees, tailored training allows each worker to focus on the ar-

eas where he or she is most in need of improvement. This results in increased training efficiency, which directly contributes to improved overall company performance. Another relevant benefit relates to reducing employee turnover. Investing in the professional development of employees, offering them concrete opportunities for growth and improvement, generates a sense of loyalty to the company, thereby reducing the intention to change jobs and strengthening organizational commitment.

In parallel, traditional training methods have undergone a significant transformation in recent years with the introduction of new forms of learning, which take full advantage of the potential offered by digital technology. Prominent among these are microlearning, e-learning and gamification, which have proven to be extremely flexible and effective tools for delivering technical and soft skills more quickly and with a higher level of employee engagement.

Microlearning, for example, involves the delivery of short, targeted training content, often usable on digital platforms and accessible at any time. This type of learning is particularly useful for workers who need to acquire information quickly and efficiently, without excessively interrupting their daily activities. E-learning, for its part, has revolutionized the way companies offer continuing education to their employees. Thanks to digital platforms, workers can access up-to-date and personalized content, eliminating space and time constraints. Learning thus becomes a flexible and continuous process, allowing employees to constantly update in line with technological and market changes.

Another relevant innovation is gamification, which involves the use of typical game elements (such as rewards, rankings and challenges) within training programs to increase engagement and motivation. This approach, particularly prevalent in the most innovative companies, has been shown to significantly improve employee engagement, making the learning process more enjoyable and interactive. Indeed, gamification leverages competitive dynamics and rewards to incentivize active participation and achievement of training objectives.

The most innovative companies have already adopted these practices, allowing employees to tailor their development paths to their specific needs. These new forms of learning, in addition to being flexible, ensure that training is not limited to a single event, but becomes a continuous and focused process.

Performance management and succession planning are two fundamental pillars of the HR function, closely interconnected and aimed at ensuring both short-term operational efficiency and long-term strategic continuity of the organization. These processes not only promote optimal human capital management, but also contribute to the creation of

a flexible corporate structure capable of adapting to market changes and meeting future challenges.

Performance management is an ongoing process that aims to monitor, evaluate, and improve employees' contributions to corporate goals. This system, when implemented effectively, becomes an essential element in aligning individual performance with overall organizational strategies. Traditionally, performance management focused on annual employee evaluations; however, in recent years, it has evolved to a more dynamic and continuous approach. Today, performance management involves periodic and ongoing appraisal, based on individual goals consistent with corporate strategy, and accompanied by regular feedback between the employee and supervisor. This process makes it possible to promote professional growth, identifying areas for improvement and opportunities for development and creating a culture of continuous improvement and organizational learning (Aguinis, 2019).

In parallel, succession planning is a strategic component of human capital management designed to ensure continuity of business operations and stability of leadership, especially during times of transition or change. Succession planning involves identifying and developing internal talent to fill key roles in the future, ensuring that the company has a pool of candidates ready to take the place of key figures who leave the organization due to retirement, promotion or other causes. This process requires close collaboration between management and the HR department, with ongoing assessment of employees' skills and potential to identify those who possess the qualities needed to fill roles of greater responsibility. Succession planning not only ensures a smooth transition into leadership positions, but also helps to maintain operational stability and preserve corporate culture by avoiding disruptions in decision-making flows.

The integration of performance management and succession planning creates a holistic management system that enables the organization not only to monitor and improve current performance, but also to prepare for the future through internal talent development. This approach incentivizes vertical mobility within the organization, giving employees the opportunity to grow and develop, both professionally and personally. As a result, employees are more motivated and engaged, as they see HR practices not only as a performance monitoring system, but also as an opportunity for career and professional fulfillment. This leads to an improved business climate and contributes to higher employee retention, reducing the costs associated with turnover and strengthening the organization's competitiveness (Rothwell, 2010).

Compensation and benefits

The compensation structure and benefits package offered by an organization significantly influence its ability to attract and retain talent, as well as the level of employee satisfaction and motivation. In the past, monetary compensation constituted the main element of compensation; however, increasingly, companies are adopting a holistic and diversified approach, which includes modes of compensation that are not exclusively financial, such as organizational flexibility options, additional health coverage and pension incentives. Benefits typically offered by some companies include transport services, vouchers for the purchase of consumer goods, and programmes to support the improvement of professional skills. These components, including economic benefits of various kinds, are designed to meet the heterogeneous needs of a modern workforce, fostering a better balance between professional and personal life and promoting the overall well-being of employees (Armstrong and Brown, 2023).

Adopting a comprehensive compensation strategy requires a balanced approach that takes into account both internal equity and external competitiveness. Internal equity relates to whether employees perceive their compensation as fair relative to their peers, while external competitiveness requires that compensation packages are in line with market trends to prevent talent from being attracted to other offers. This balancing becomes essential to maintain employee motivation and engagement while ensuring that the organization remains competitive in the labor market. Companies that manage to implement flexible compensation experience higher retention rates and greater satisfaction among employees, as they perceive a real investment by the company in their well-being and development (Appel et al., 2023).

In this context, the concept of Total Reward Strategy has become critical for many organizations. This strategy integrates monetary compensation with a set of non-financial benefits, creating more comprehensive and attractive compensation packages. In addition to traditional benefits such as supplemental health care and retirement plans, the Total Reward Strategy also includes elements such as mental and physical well-being, work flexibility, and work-life balance. This strategy recognizes that overall employee well-being is a key factor in motivation and productivity, as employees who feel supported tend to be more motivated and engaged. By taking an approach that goes beyond mere financial compensation, companies are able to create a work environment in which employees feel valued and encouraged to stay for the long term.

A particularly relevant aspect of the Total Reward Strategy is work flexibility, a benefit that has gained crucial importance especially in the wake of the COVID-19 pandemic.

The ability to work remotely or manage one's work time more autonomously has become one of the most frequent requests from modern employees. Providing flexibility not only helps improve work-life balance, but also increases employee productivity and satisfaction. Indeed, this benefit meets the needs of an increasingly diverse workforce, which includes not only younger generations, but also employees with family responsibilities or special needs that require flexible work schedules (Armstrong and Brown, 2023).

Organizational Well-Being

Organizational well-being has gained increasing importance in corporate policies in recent years, becoming one of the fundamental pillars of Human Resource Management. In a work environment that is increasingly dynamic and subject to rapid change, companies have realized that fostering a work environment that promotes the overall well-being of employees not only improves the business climate, but also has a positive impact on other strategic aspects, such as staff retention and the reduction of negative phenomena such as absenteeism and turnover. When employees perceive that their well-being is a priority, they tend to develop a greater sense of belonging and become actively engaged in their work, thereby improving the organization's overall productivity and efficiency.

Initiatives aimed at organizational wellness, managed by the HR department, are based on a wide range of interventions, ranging from introducing mental health support programs to enhancing health care. The increasing focus on mental health reflects a significant cultural shift, where job stress, anxiety, and burnout are being recognized as real problems that can impair quality of work life and reduce job performance. As a result, many companies have begun to implement psychological counseling services, stress management courses, and other forms of dedicated support for employees to prevent or address these problems.

In parallel, enhancing health care is another piece in building a work environment that supports the overall well-being of employees. More and more companies are offering supplemental health care plans that go beyond traditional health coverage, including, for example, preventive and physical wellness programs, regular check-ups, and access to specialists to proactively monitor employee health. This focus on physical health reflects a holistic view of organizational wellness, in which the company becomes a partner in maintaining employee mental and physical well-being, helping to reduce sick leave and improve morale.

Another crucial aspect of modern welfare policies is the promotion of a better work-life balance. The introduction of work-life balance policies, such as flexible hours and remote work, has proven to be extremely effective in improving the quality of life for employees. These measures make it easier for workers to manage personal and professional

responsibilities, reducing the stress associated with rigid time management and fostering greater autonomy. Hourly flexibility allows employees to adapt their working hours to their personal needs, while remote work, which has become particularly relevant in the post-pandemic environment, has been shown to improve not only employee satisfaction but also employee productivity. Companies that adopt these policies show greater adaptability to the needs of their workers, contributing to a more inclusive and wellness-oriented work environment.

In addition, many organizations promote sports and recreational activities as an integral part of their wellness policies. These initiatives may include the organization of sporting events, access to company gyms or fitness programs, as well as recreational and social activities designed to foster socialization and a sense of community among employees. These interventions not only improve workers' physical health, but also strengthen the social bond between colleagues, creating a more harmonious and cohesive work climate.

The adoption of these policies also has a significant impact on employee motivation. Empirical studies have shown that organizational well-being is directly related to productivity: happier and healthier employees tend to be more motivated, creative and resilient. In addition, promoting well-being reduces the likelihood of burnout and stress-related illness, phenomena that can have negative consequences for both the employee and the organization as a whole (Salas-Vallina et al., 2020).

2.1.3. Navigating complexity: challenges in modern HR

HR is facing a range of challenges as never before that reflect the profound changes taking place in the world of work, society, and technology. These challenges require constant adaptability and a strategic approach to successfully manage the transformations that are redefining the role and responsibilities of HR within organizations. The ability to navigate this complexity has become essential to ensure the long-term competitiveness and sustainability of companies.

A major challenge is managing diversity and inclusion within organizations. In an increasingly interconnected and multicultural global environment, HR faces the task of developing and implementing policies that promote an inclusive work environment, where individual differences are not only accepted but also valued as an opportunity to enrich corporate culture and stimulate innovation. Diversity extends beyond differences in gender, ethnicity, or sexual orientation to include variables such as age, socioeconomic status, disability, and cognitive differences. Organizations that can effectively integrate this diversity can gain significant competitive advantages, such as greater creativity, bet-

ter understanding of global markets, and greater attraction of talent. However, managing diversity is not without its challenges, as it requires overcoming entrenched biases and promoting cultural change within the organization. This requires ongoing HR efforts to educate and raise awareness among employees, promoting a culture of respect and inclusion that can translate into concrete company policies and daily practices (Shen et al., 2009).

Another crucial challenge is digital transformation. The integration of new technologies into HR processes not only requires the adoption of innovative tools, such as AI and big data, but also requires a rethinking of the way HR operates. AI, for example, can automate many traditional processes, such as candidate selection, performance appraisal, and training management, allowing HR to focus on more strategic tasks. According to studies by Deloitte, the implementation of AI in HR processes can reduce staff selection time by 30-50 %, improving effectiveness in selecting the most suitable candidates. People analytics platforms enable the collection and analysis of huge amounts of data, providing valuable insights to optimize HR management (Violini and Brown, 2020).

However, the adoption of advanced technologies also brings ethical challenges. The use of AI in HR raises issues related to the transparency of decision-making processes and the management of personal data. Some scholars argue that excessive automation may reduce the human element in people management, while others warn of the risks of algorithmic discrimination, where selection algorithms could reflect or amplify existing biases. To avoid such risks, companies need to take an ethical approach to digital transformation, ensuring that the technologies used are transparent, reliable, and respectful of employee privacy (Malone, 2004).

In addition to technological challenges, HR must address changing employee expectations, especially in an increasingly fluid and competitive labor market. New generations of workers, particularly the Millennials and Generation Z, attach great importance to factors such as flexibility, remote work, and the ability to contribute to social causes through their work. Unlike the Baby Boomers, who tended to prioritize economic stability and job security, the younger generation seeks an environment that reflects their personal and social values (Randstad, 2024).

According to research by PwC, 75 % of Millennials prefer to work for companies that have a strong inclusive culture and promote relevant social causes. In addition, work flexibility has become a major demand, with remote work continuing to gain popularity in the wake of the COVID-19 pandemic. HR must therefore rethink its policies to meet these new demands, implementing practices that promote employee well-being and improve the

employee experience. Introducing well-being programs and focusing on mental health have become critical to maintaining high levels of engagement and productivity (PwC, 2021).

Finally, one of the most complex challenges facing HR is change management. In an era of rapid change, both economic and technological, organizations must be able to adapt quickly to survive and thrive. HR plays a crucial role in this adaptation process, as it is responsible for guiding employees through organizational transitions, minimizing resistance and promoting a positive attitude toward change. Change management requires effective leadership that can clearly communicate the vision and goals of the change, as well as involve employees in the decision-making process. In addition, HR must be prepared to handle the emotional and psychological complexities that change can bring, providing support and training to help employees develop the resilience needed to face new challenges. In this context, HR's ability to manage change becomes a key determinant of an organization's long-term success (Guest, 2017).

Talent shortage

Talent shortage is a phenomenon that has become increasingly important in the global labor market, particularly in technology-intensive industries. It is a condition in which the demand for professional skills exceeds the available supply, creating a number of difficulties for organizations competing to attract and retain the talent needed to support their growth and innovation strategies. The underlying causes of talent shortage are multifaceted and include technological, demographic and educational factors that have transformed the employment landscape in recent decades (Cappelli, 2014).

The increasing digitization of economies and the widespread adoption of emerging technologies, such as Artificial Intelligence, big data, and robotics, have created an unprecedented demand for workers with highly specialized technical skills. However, the education system and vocational training programs have failed to evolve as quickly, contributing to a growing mismatch between the skills required by companies and those actually possessed by workers.

In Italy, the Anpal and Unioncamere Annual Report shows that in 2023 out of 5.5 million vacant positions, 45 % were difficult to find, with average selection times extending beyond four months (Linfante, 2023). The HR Innovation Practice Observatory's Research also found that 88 % of organizations experienced difficulties in hiring new staff, a trend that is increasing from previous years. This situation reflects a structural mismatch between labor supply and demand that is not limited to technical skills, but also involves soft skills, such as the ability to work in teams, leadership, and resilience. This phenomenon

occurs despite a high unemployment rate (7.2 %) and a significant %age of inactive people (33.2 %) in the Italian labor market (Cappelli, 2014).

The phenomenon of talent shortage has been carefully studied as a complex phenomenon, aggravated by a number of structural factors that vary according to the economic and social context. Among these, one of the most relevant is the demographic factor, particularly the aging of the population in developed countries. Studies by Bloom et al. have shown that in countries with a steadily increasing median age of the population, there is a significant reduction in the active labor force, implying a contraction in the number of qualified candidates available to fill skilled roles. This phenomenon is particularly relevant in Europe and Japan, where aging populations have created a real "bottleneck" in the availability of workers, making it more difficult for firms to attract the talent needed to sustain economic growth and innovation (Fink et al., 2011).

In Italy, demographic decline has been a major contributor to the creation of a structural gap between the demand for skilled labor and the available supply. The most affected occupations are those related to digitization, Information Technology and innovation, sectors that are experiencing exponential growth in terms of demand for skills, but suffer from a shortage of adequately trained workers. According to employment forecasts provided by Cedefop, the Italian labor market will see an increase in demand for skilled workers for the period 2020-2030, with a strong focus on intellectual and technical professions, but without a parallel increase in the supply of talent. This imbalance is likely to worsen further in the absence of policy measures aimed at closing the gap between supply and demand (Cedefop, 2018).

In terms of economic impact, talent shortage is not just a business issue, but an issue that profoundly affects the entire economic system. Recent studies by Korn Ferry have estimated that, by 2030, talent shortages could lead to a reduction in global Gross Domestic Product of up to 2 %, with a loss of revenue potentially exceeding $8.5 trillion. This impact will be felt most acutely in advanced economies, where innovation and competitiveness depend heavily on the availability of workers with specialized skills. A lack of talent can slow the adoption of new technologies, reduce the effectiveness of innovation strategies, and limit the ability of firms to expand into global markets (Binvel et al., 2018).

Another relevant dimension in the discussion of talent shortage is the mismatch between workers' expectations and the conditions offered by companies. High-skilled workers are not only attracted by competitive pay, but also seek opportunities for professional development, work-life balance, and a work environment that reflects their personal values. This transformation in expectations, which is particularly evident among younger gener-

ations such as Millennials and Generation Z, is forcing companies to rethink their Human Resource Management policies, paying more attention to factors such as work flexibility, organizational well-being and the possibility of personalized career paths. Companies that fail to adapt to these new requirements risk losing competitiveness in the labor market, resulting in difficulties in attracting and retaining needed talent.

An additional factor contributing to exacerbating talent shortage is the increasing complexity of the job profiles required. In the fourth industrial revolution, advanced skills in fields such as industrial automation, additive manufacturing and advanced data analytics are becoming increasingly in demand, but also increasingly difficult to find. According to a report by Deloitte, many companies are not prepared to meet this challenge and continue to report serious gaps in the availability of workers with advanced digital skills. This phenomenon is particularly evident in industries related to Industry 4.0, where innovation cycles are extremely rapid and require skills that are often not yet widely available in the labor market (Violini and Brown, 2020).

To respond to these critical issues, organizations need to rethink their recruitment and personnel management strategies. Traditional recruitment methods, based mainly on the assessment of prior experience and academic qualifications, may no longer be sufficient to deal with the complexity of talent shortage. Recent studies have stressed the importance of innovative solutions, such as the adoption of digital tools and the use of Artificial Intelligence platforms to optimize recruitment processes. According to Chamorro-Premuzic, Artificial Intelligence is playing an increasingly important role in recruitment, as it allows large volumes of data to be analyzed and candidates with the most suitable skills to be identified more quickly and efficiently than traditional methods. These tools also make it possible to reduce unconscious bias in selection processes, thereby improving the fairness and effectiveness of hiring decisions (Chamorro-Premuzic et al., 2017).

Finally, the response to talent shortage cannot be limited to improving selection processes alone, but must also include a review of compensation and personnel management policies. Companies must adopt a Total Reward Strategy that is not limited to monetary compensation, but integrates elements such as organizational well-being, work flexibility, continuing education, and corporate social responsibility. This approach is particularly effective in attracting and retaining talent, especially in a labor market increasingly characterized by high mobility and rapid changes in worker expectations. A study also found that companies that implement flexible compensation packages tailored to individual employee preferences experience higher retention rates and greater job satisfaction. This underscores the importance of an integrated approach to Human Resource Management that aims to create a work environment that meets both the tangible and intangible needs

of employees (Armstrong and Brown, 2023).

Great Resignations and Great Regret

In 2024, the Great Resignation phenomenon has taken on a new dimension, marking a significant change in the motivations for people to leave their jobs. According to a survey conducted by the HR Innovation Practice Observatory of a sample of 1,500 Italian workers, physical and mental well-being has, for the first time, become the main reason for changing jobs, accounting for 36 % of the overall reasons why a worker decides to leave their employment (Figure A.1). This figure represents a historic turning point, signaling a growing awareness among workers about quality of life and the importance of achieving a better work-life balance (Osservatorio HR Innovation Practices, 2024a).

Il mio benessere fisico e/o mentale	36%
L'entità della retribuzione e benefit economici	35%
Le opportunità di crescita e/o carriera	24%
La distanza della sede di lavoro rispetto alla mia abitazione	18%
La tipologia del contratto di lavoro	17%
Il carico di lavoro	17%
Le relazioni interpersonali con capi/e, colleghi/e e collaboratori/ici	16%
Il contenuto del mio lavoro	15%
La flessibilità nell'organizzare l'orario di lavoro	13%
L'opportunità di inseguire le mie passioni personali	12%
La flessibilità nel decidere dove lavorare	9%
Il trasferimento in un'altra città	8%
La necessità di una pausa dal lavoro	6%
L'avvio di una propria attività imprenditoriale	6%
L'inclusività dell'organizzazione e la propensione a valorizzare la diversità	4%
L'aderenza ai valori aziendali e l'impatto sociale/ ambientale	3%

Figure 2.1: Reasons why a worker decides to leave their employment.

The focus on well-being and quality of life is not an entirely new phenomenon, but the pandemic of COVID-19 has significantly accelerated this process, transforming the perception of work from a mere source of income and social status to a means of achieving emotional stability, flexibility, and overall well-being. Recent studies confirm that more and more workers aspire to flexible work patterns that enable them to better balance work and personal life, reducing stress and improving psychological well-being. The demand for flexible models has become a key component in the choice of new jobs, prompting many organizations to rethink their operational structures and introduce hybrid or remote forms of work to maintain competitiveness in attracting and retaining talent (Wigert et al.,

2021).

At the same time, traditional factors such as compensation and career advancement remain relevant. 35 % of workers continue to seek improvements in pay, while 24 % are motivated by the possibility of career growth. However the traditional vertical career structure is gradually being replaced by a more fluid and less linear model, which is particularly valued by new generations of workers, such as Generation Z (Pfeffer, 2018). Gen Z, who have grown up in a highly digitized environment and are characterized by a more flexible view of working life, tend to favor diverse work experiences over vertical growth within the same organization. This is in stark contrast to the more traditional view of Baby Boomers, who prefer stable and progressive career paths, thus reflecting a significant generational gap (De Smet et al., 2022).

A crucial aspect emerging from Great Resignations is the growing importance of shared corporate values. The 87 % of workers who change jobs or intend to do so check the consistency between their personal values and those of the target company. This phenomenon is particularly pronounced among young workers, who actively use tools such as social media and company websites to assess values compatibility before making a job decision. This emphasis on shared values reflects a profound change in the way workers view their employment: no longer just as an economic transaction, but as a meaningful experience that contributes to their personal fulfillment. Rounding out the picture of transformations in the labor market is the increasingly prominent emergence of the phenomenon of the "Great Regret", which describes the growing repentance of many workers who, after resigning voluntarily, find themselves dissatisfied with their new position or new working conditions. In 2024, this phenomenon saw a significant increase, up 37 % from the previous year, bringing to 56 % the percentage of people who, after changing jobs, regretted their decision (Osservatorio HR Innovation Practices, 2024a).

The reasons for this regret are complex and varied. On the one hand, about 20 % of the sample reported a mismatch between promises made during the selection process and the reality of the new job. Often, workers are faced with unrealistic expectations, with working conditions that do not reflect what was communicated during the hiring process. This mismatch between promises and reality can involve both economic aspects, such as benefits and salaries, and elements related to the role or responsibilities assigned.

Another crucial factor fueling the Great Regret phenomenon concerns the work climate. More than 25 % of workers who have regretted their choice complain of problems related to corporate culture, operational practices, and organizational customs. In many cases, the new work reality turns out to be less welcoming and more stressful than expected, with an

environment that does not adequately support employee well-being. Workers often face business practices and relational dynamics that are not conducive to collaboration but are characterized by strong competition, undermining the quality of professional interactions and, consequently, job satisfaction.

The Great Regret is not just about short-term regret, but reflects a broader distrust of choices made during a phase of change that, for many, was supposed to represent a career breakthrough or an improvement in living conditions. This phenomenon also represents a reaction to the pressure exerted by the labor market, which in recent years has prompted many workers to reconsider their priorities and seek opportunities that would better meet their personal and professional needs. However, the uncertainty associated with new work environments and economic conditions has often led to hasty choices, which have not always produced the desired results.

In many cases, regret also stems from the fact that workers fail to find in their new jobs the flexibility and psychological well-being they had envisioned. Often, companies are unable to meet the growing expectations related to work-life balance, the ability to work remotely, or the management of workloads. The Great Regret becomes, therefore, a symptom of a labor market undergoing profound transformation, in which people seek stability and well-being, but often find themselves navigating opportunities that do not always guarantee a match between expectations and reality.

Reskilling and upskilling to tackle AI challenges

A crucial issue facing HR departments in relation to Artificial Intelligence concerns the management of workforce reskilling and upskilling. The widespread adoption of AI is radically transforming the labor market, creating new skill requirements and requiring organizations to review their training and professional development models. Although AI presents a great opportunity to automate processes and improve business efficiency, it requires a strategic rethinking of the skills needed for the future of work.

Reskilling refers to the need to retrain workers to prepare them for new roles emerging as a result of digital transformation and process automation. In many cases, the introduction of AI can make certain roles or tasks obsolete, making it essential for employees to acquire new or completely different skills. According to recent estimates, 34 % of people currently employed in roles destined for decline will be retrained to perform new tasks, while another 8 % of staff may be subject to redeployment as the skills required for their current roles become obsolete.

Upskilling, on the other hand, focuses on upgrading employees' existing skills, improving

and adapting them to the new requirements imposed by AI integration. Sixty-two % of job roles will be enriched by new skills required by the increasing use of Artificial Intelligence, implying that many workers will need to improve their technical and digital knowledge to remain competitive. This challenge places an obligation on HR departments to develop and implement continuing education programs that can prepare the workforce to interact with advanced technologies.

Organizations must take a strategic and long-term view, investing not only in advanced technologies but also in human capital, as the introduction of new technologies without adequate training programs risks leaving a significant portion of the workforce behind. HR departments are tasked with ensuring that core competencies, such as the ability to work with ethical AI systems, design algorithms, and interpret the results provided by AI, are at the center of upskilling and reskilling pathways. In this context, training needs to be customized and ongoing, with a focus not only on technical skills, but also on soft skills such as creativity, the ability to solve complex problems, and adaptability, all skills that complement the adoption of advanced technologies.

HR departments must also consider the organizational implications of such transformations. The process of reskilling and upskilling cannot be seen as an isolated activity, but rather as an integrated element within the overall business strategy. An organization's ability to innovate and adapt to technological change will depend largely on the preparation and training of its workforce. Consequently, HR departments must take the lead in planning and executing skills development programs, ensuring that employees can grow with the organization and that the company remains competitive in a rapidly changing global environment (Cisco Systems Inc, 2024).

2.1.4. Emerging trends in Human Capital Management

In recent years, the world of work has undergone profound changes, many of which have been accelerated or even triggered by extraordinary events, such as the COVID-19 pandemic. These transformations have significantly altered the relationship between employers and employees, reshaping workers' expectations, recruitment processes and Human Resources management.

The HR Directors priorities for 2024 clearly reflect the uncertainty that characterises the Italian labour market. On the one hand, there are positive signs, such as the achievement in 2023 of the highest employment level ever recorded, a 2.2 % increase compared to 2022, and the increase of workers with permanent contracts. On the other hand, a growing disaffection towards work can be observed, accompanied by an increasingly frag-

ile relationship between organizations and their employees (Osservatorio HR Innovation Practices, 2024a).

In this context, HR Departments are called upon to face a series of complex challenges: among these, the talent shortage, known as Talent Shortage, and the phenomenon of Large Resignations, which reflects a widespread discontent in the world of work to which is added the growing difficulty for companies to build an effective and attractive employer branding, capable of standing out in an extremely competitive labour market.

Today, it is no longer enough to offer a competitive salary; workers are increasingly looking for opportunities for personal development, psychophysical well-being and work environments that promote shared values. This evolution has turned employer branding into an increasingly complex challenge for organizations, which can no longer compete solely on an economic level, but must also differentiate themselves ethically and socially. Companies are called upon to guarantee high standards of work quality, focusing in particular on the psycho-physical well-being of employees, their professional and personal enhancement, as well as promoting an effective work-life balance. Moreover, flexibility, both in terms of working hours and location, has become a crucial element in attracting and retaining talent in an increasingly dynamic and changing work environment.

This phenomenon has been confirmed by a research conducted by the HR Innovation Practice Observatory of the Politecnico di Milano, which examined the answers of a sample of 143 HR Departments of Italian organizations medium-large in size by number of employees. The results of the study, illustrated in figure 2.2, show that the main challenges for 2024 include, first and foremost, increasing employee engagement, followed by optimising employer branding strategies and retraining the workforce. These aspects are key to addressing the current labour market landscape, which requires organizations to adopt innovative and sustainable approaches in order to attract and retain top talent. New employee demands, characterised by an increasing focus on personal well-being, flexibility and consistency with corporate values, require a rethinking of traditional Human Resources management practices.
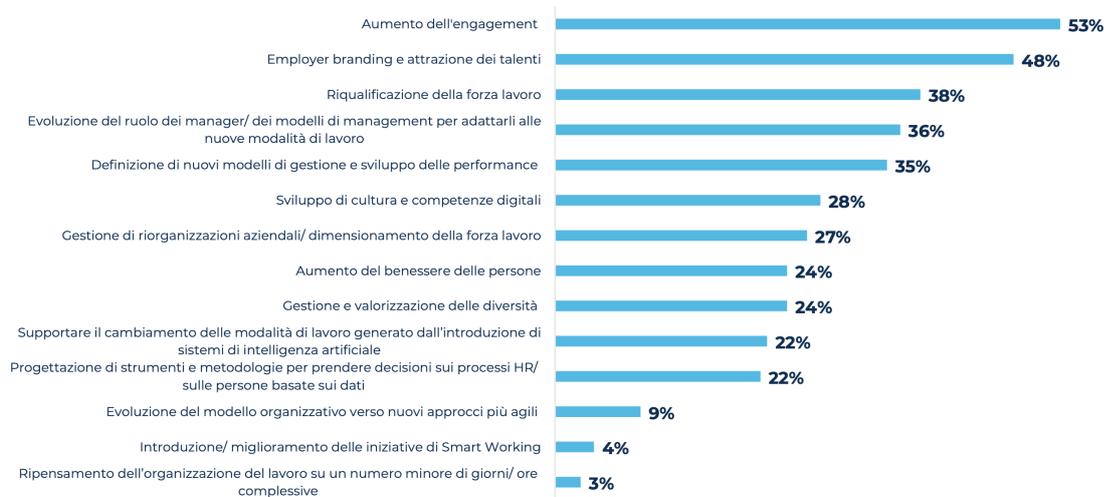
Figure 2.2: The main challenges of HR departments in 2024.

A further challenge that HR departments are increasingly facing is the adoption of Artificial Intelligence. Currently, many organizations are still in the early stages of developing and implementing these technologies, which brings with it a number of complexities related to managing and integrating AI into business processes. Although AI offers significant potential in terms of automation, process optimization and data analysis, its application in the Human Resources context raises ethical and operational issues. organizations are challenged to balance the use of advanced technologies with the need to maintain a human approach in personnel management decisions, particularly in sensitive areas such as recruitment, performance appraisal and Human Resource Management. The challenge also extends to the need to develop new skills within the organization through reskilling and upskilling policies. The adoption of AI requires advanced technological skills, making investment in continuous training programmes essential. These training courses must prepare employees to interact effectively with new technologies, enabling them to adapt to a constantly changing work environment (Osservatorio HR Innovation Practices, 2024a).

2.1.5.   The importance of HR metrics

In this rapidly evolving landscape, the measurement of Key Performance Indicators in HR processes becomes increasingly crucial to enable companies to measure, monitor and improve their performance. The adoption of KPIs not only provides a clear picture of HR performance, but also provides managers with data-driven evidence to understand how work is being done, enabling them to propose targeted investments to improve processes

and optimize Human Resources. This section aims to outline the most significant HR-related indicators, analyzed through the available scientific papers. It is noted, however, that the topic of HR KPIs is still little explored in the academic literature, with few scientific papers published. For this reason, the analysis was also supplemented with studies from the grey literature, like less formal sources, such as company reports, white papers and industry documentation, which nonetheless offer valuable and practical insight into the understanding and application of these indicators.

In the area of *Employer Branding*, two KPIs stand out: the Candidate Return Rate and Social Media Engagement. The Candidate Return Rate measures the %age of candidates who, after an initial candidate experience, choose to reapply for new opportunities within the same company. This indicator is crucial as it reflects the quality of the candidate experience and the company's level of attractiveness in the long run. A high return rate indicates that candidates positively perceive the professional environment offered, thus building a stable and lasting pool of talent. Social Media Engagement, on the other hand, is a KPI of growing importance in the recruitment landscape as more and more candidates seek opportunities on platforms such as LinkedIn, Twitter and Instagram. This indicator measures the level of interaction, such as likes, shares and comments, on recruitment-related social content. A high level of engagement not only expands the visibility of posts, but also testifies to the effectiveness of the content marketing strategy adopted (Hillebrandt et al., 2016).

The Candidate Return Rate, on the other hand, measures the %age of candidates who return to apply for new positions after a first experience. This indicator is critical because it reflects the quality of candidate experience and the long-term attractiveness of the company. A high return rate indicates that candidates perceive the company as an attractive professional environment, even if they were not selected in their first experience, and this contributes to building a stable and lasting talent pool (Hillebrandt et al., 2016).

In the context of recruitment and skills diversification, the Careers Page Conversion Rate is of particular importance because it measures the effectiveness of the careers page in converting visitors into actual candidates. A low conversion rate could indicate barriers in the application process, such as procedures that are too complex or not intuitive, or problems in communicating job offers, which may not be attractive or clear. Improving these aspects, through more user-friendly design and more detailed position descriptions, can greatly increase this KPI, allowing the company to attract more qualified candidates. At the same time, the %age of Candidates Skills Diversity is a key indicator for promoting an inclusive and diverse workforce. Diversity of skills and background is considered a strategic lever for improving innovation and resilience in organizations. Companies that

succeed in diversifying their workforce benefit from a wider range of perspectives and creative solutions, which are crucial elements in meeting the challenges of a globalized and competitive market (Le-Thi and Tuyen, 2021).

Regarding the efficiency of the selection process, Average Time to Hire is one of the most critical indicators, as it measures the average time taken to complete the entire selection and hiring process. This KPI is crucial because it directly affects the company's ability to fill vacant positions quickly and maintain productivity. Reduced time to hire allows the company to respond to operational needs in a timely manner, preventing important positions from remaining unfilled for too long. However, reducing this time without compromising candidate quality is a challenge that requires a careful balance between efficiency and accuracy in the selection process. In parallel, the Number of Candidates Processed per Unit of Time is another key KPI, as it measures the organization's ability to handle a high volume of applications in a given period. This indicator is particularly critical in situations where companies face a large influx of applications, such as during massive recruitment campaigns or when there is a high turnover of staff. A company's ability to efficiently manage a high number of applications without sacrificing the quality of the assessment is essential to maintaining competitiveness in the labor market (Le-Thi and Tuyen, 2021).

Under *Learning & Development*, a number of key KPIs emerge as key indicators for promoting a corporate culture geared toward growth and continuous learning. For professional growth, the KPI "Average Time to Fill Positions with Internal Employees" measures the effectiveness of internal mobility and career planning practices. A reduced time to fill open positions through internal resources signals good talent management and reduces costs associated with external hiring. In addition, "Average Time to Promotion" indicates the effectiveness of skill development programs, and adequate promotion timing is linked to higher employee satisfaction and motivation.

In the field of feedback management, "Feedback Quality Rate" and "Average Feedback Generation Time" are essential KPIs that measure the quality and speed of feedback provided, respectively. A high feedback quality rate and timely generation improve transparency and foster a culture of continuous learning, enabling employees to make quick changes to their performance (Charlwood and Guenole, 2022).

Regarding Training, KPIs such as "Employee Satisfaction with Training" and "Skills Advancement Rate" assess the impact of these programs. Employee satisfaction reflects the perceived usefulness and relevance of the skills acquired, while a high skills advancement rate indicates the effectiveness of development programs (Kumar et al., 2021).

Finally, employee well-being and engagement can be monitored through KPIs such as the Employee well-being Score, which assesses the level of employee satisfaction and well-being based on internal surveys. This indicator is particularly relevant because a high level of well-being correlates with higher productivity, improved quality of work, and reduced turnover-all factors that ontribute to improving both individual and collective performance (Kurnia and Widigdo, 2021).

In addition, another relevant KPI is the Rate of Employees who Use Benefits measures the effectiveness of welfare programs offered by the company. A high rate of benefit use suggests that the services offered adequately meet the needs of employees, improving their overall satisfaction level and incentivizing their active participation. This KPI is indicative of the company's ability to tailor welfare programs to the actual needs of employees, which may vary depending on demographic or situational factors, such as employees' age, role, or family needs. Well-designed welfare programs also help to create a stronger bond between the company and its staff, thereby helping to build a more inclusive corporate culture that is attentive to individual needs (Kurnia and Widigdo, 2021).

It will be particularly interesting to measure how these KPIs vary with the introduction of new tools and technologies such as Artificial Intelligence. Throughout this thesis work, it will be explored how the adoption of innovative tools such as AI can affect existing KPIs, making it possible to continuously improve HR practices.

2.1.6. The future of HR

The future of HR will be strongly influenced by the increasingly pervasive integration of AI technologies, which are expected to profoundly revolutionize talent management and HR process automation. The adoption of AI-based solutions will not only transform the daily activities of HR professionals, but will also have a decisive impact on their ability to manage resources in a more strategic and value-driven manner. Indeed, as evidenced by various studies, AI offers powerful tools such as predictive analytics and Machine Learning, which will enable companies to more accurately identify emerging talent, map the skills needed for the future, and create customized career paths that meet not only the needs of the organization but also the individual aspirations of employees (Hancock et al., 2023).

Automation of some HR processes, such as recruitment, selection and performance management, will also allow HR professionals to spend more time on more value-added activities, such as strategic workforce planning and internal skills development. This could help create a more inclusive and agile work environment in which adaptability and continuous

learning will become central aspects of maintaining business competitiveness.

However, not all companies are currently able to take full advantage of the potential offered by AI and advanced digital technologies. This is especially true for small and medium-sized enterprises (SMEs), which often face challenges related to high implementation costs and the lack of specialized skills needed to manage and integrate these technologies into their business processes (Violini and Brown, 2020). In contrast, large enterprises, with larger financial and Human Resources, are generally able to invest in advanced technology solutions and bear the costs associated with their adoption and management.

Nevertheless, the technology gap between large companies and SMEs may narrow in the near future. According to predictions, the increasing availability of scalable and customizable technology solutions, combined with progressive cost reduction, will make AI-based technologies accessible to SMEs as well. This will enable more and more companies to adopt innovative tools to improve the efficiency of HR processes, increase competitiveness and attract talent in an ever-changing labor market (PwC, 2021).

Moreover, despite current challenges, SMEs have great potential to adapt, and with the right support and access to cheaper and more intuitive technology tools, they could play a key role in shaping new HR trends in the coming years. The adoption of AI by these companies could not only improve their productivity, but also promote diversity and inclusion, fostering a more innovative work environment that can respond more quickly to market needs (Ekuma, 2024).

2.2. The rise of Artificial Intelligence: a historical perspective

The advent of Artificial Intelligence marks an era of extraordinary technological transformation, the impact of which permeates all aspects of human and social life. In the following pages, this section aims to comprehensively map the evolution of AI, from its philosophical and mathematical roots, through its historical developments, to its most advanced applications such as Generative AI. It also examines how the integration of AI into business functions is improving efficiency and revolutionizing entire operating models. Finally, this section provides an overview of the risks and ethical challenges that AI introduces and how governing bodies are addressing these issues.

2.2.1. From ancient philosophy to modern algorithms

Artificial Intelligence has deep roots dating back to philosophical and mathematical concepts developed centuries ago, but it is only during the 20th century that AI began to take shape as a scientific and technological discipline. This section explores the evolution of AI from its origins to the beginning of the new millennium, a period marked by fundamental innovations, moments of crisis, and subsequent revivals that paved the way for modern applications.

The origins of Artificial Intelligence

The concept of Artificial Intelligence has its roots in ancient philosophical speculations about intelligence and the mind. Greek philosophers, such as Aristotle, were among the first to explore the idea of a mechanical mind through their studies of logic and reasoning. However, it was not until the advent of modern mathematics and symbolic logic in the 19th century, thanks to pioneers such as George Boole, that the theoretical basis for logical computation and the automation of mental processes began to be formalized. A crucial turning point occurred in 1936, when Alan Turing, a British mathematician, proposed the concept of a "universal machine", now known as the Turing machine. This theoretical model, capable of simulating any mathematical algorithm, lays the foundation for the notion of universal computation, an essential milestone for the future development of AI. In addition, in his famous 1950 article, "Computing Machinery and Intelligence", Turing introduced the so-called "Turing Test", a criterion for determining whether a machine can be considered intelligent, which is still at the center of Artificial Intelligence debates today.

The emergence of Artificial Intelligence: overview of the 1950s and 1960s

Artificial Intelligence emerged as an official research field in the late 1950s, a period when advances in formal logic, information theory and the first electronic computing machines offered new opportunities for exploration. In 1956, a group of researchers, including John McCarthy, Marvin Minsky, Nathaniel Rochester and Claude Shannon, organized the famous Dartmouth Conference, a summer seminar during which the term "Artificial Intelligence" was coined. This event is often regarded as the official birth moment of the field, marking the beginning of an era of intense scientific activity. During the 1950s and 1960s, researchers developed the first programs capable of performing specific tasks considered "intelligent", such as solving mathematical problems or playing chess. A significant example is the Logic Theorist program, developed by Allen Newell and Herbert A. Simon in 1956, considered the first AI program, capable of proving logical theorems from basic axioms. Another important contribution came in 1957, when Frank Rosenblatt developed the "perceptron", a simple artificial neural network that laid the foundation for the future development of Machine Learning.

The AI winters of the 1970s

Despite initial successes, the initial enthusiasm for AI runs up against the harsh reality of technical and theoretical limitations. In the 1970s, the field entered a stagnant phase known as the "AI Winter", a period characterized by reduced interest and funding for Artificial Intelligence research. Initial expectations turned out to be too ambitious compared to the real capabilities of the available technologies: AI systems proved fragile, unable to generalize knowledge beyond specific tasks and heavily dependent on manual programming. A major problem lies in the inability of early AI technologies to handle complex real-world problems, such as visual recognition or natural language understanding. Neural networks, for example, prove unable to learn effectively due to the lack of proper training techniques and limited computational power at the time. This leads to a drastic reduction in government and industry funding for AI research, especially in the United States and the United Kingdom.

The revival of AI in the 1980s and 1990s

Despite the crisis, the 1980s saw a slow but significant revival of interest in Artificial Intelligence, thanks to a number of theoretical and practical innovations. A key contribution came with the development of "expert systems", programs that simulate human decision making in specific domains using rules based on expert knowledge. A prime example is the MYCIN system, developed in the 1970s at Stanford University, which diagnoses bacterial infections and recommends treatments. These systems demonstrate the practi-

cal utility of AI in real-world settings and lead to renewed interest and investment. At the same time, the field of neural networks experiences a new era with the discovery of back-propagation algorithms, which allow networks to learn from large amounts of data more effectively. This period also saw the emergence of Machine Learning as a distinctive sub-discipline of AI, focused on the idea that machines can learn from data without being explicitly programmed for each individual task. Supervised, unsupervised and reinforcement learning algorithms developed during these years, laying the foundation for many of today's AI applications.

Towards 2000: the beginning of a new era

In the late 1990s, Artificial Intelligence began to consolidate as a mature scientific discipline, with practical applications beginning to penetrate several industries. Advances in processors, the availability of large-scale data, and improvements in learning algorithms make it possible to overcome many of the technical limitations that had plagued previous generations of AI systems. Industry began to recognize the potential of AI, with large technology companies such as IBM, Microsoft and Google beginning to invest heavily in the field. The period between 1990 and 2000 also marks the emergence of AI as a topic of global interest, with more and more nations recognizing the strategic importance of the technology for the economic and social future. Artificial Intelligence is now seen not only as an academic curiosity, but as a driving force for technological innovation in the 21st century (Narsinghani, 2024).

2.2.2.   AI in the 21st Century: the generative era

The new millennium marked a period of unprecedented renaissance and innovation in the field of Artificial Intelligence, an evolution that has led AI to become an essential component of modern society. This chapter explores the evolution of AI from 2000 until the emergence of generative AI technologies, highlighting the major developments that have shaped the current landscape.

The revolution of Machine and Deep Learning

At the beginning of the 21st century, Artificial Intelligence has benefited from tremendous advances due to the availability of large amounts of data (Big Data), increased computing power, and the development of new algorithms. In particular, the emergence of deep learning has been a turning point. Deep neural networks, which use many layers of artificial neurons to learn complex representations from data, have proven extremely effective in tasks such as image recognition and natural language processing. A pivotal moment came in 2012, when a convolutional neural network developed by Geoffrey Hinton and his

colleagues won the ImageNet competition, far outperforming traditional computer vision techniques. This success catalyzed global interest in deep learning and prompted technology companies and research centers to invest heavily in the development of advanced AI.

In the second decade of the 2000s, AI saw massive deployment in industrial and commercial applications. Sectors such as healthcare, finance, logistics and entertainment began to integrate AI into their daily operations. Virtual assistants such as Apple's Siri and Alexa, based on AI technologies, have become commonly used tools, demonstrating the potential of Artificial Intelligence in improving user experience and automating repetitive tasks. In parallel, advances in Natural Language Processing (NLP) have led to the development of models such as BERT (Bidirectional Encoder Representations from Transformers) and GPT (Generative Pretrained Transformer), which are capable of understanding and generating text with an unprecedented degree of accuracy and consistency. These models have laid the foundation for generative AI applications, opening new frontiers in automatic content creation.

The Generative Artificial Intelligence

In 2020, OpenAI released GPT-3, a generative language model with 175 billion parameters, an unprecedented capability that marked a real paradigm shift in AI. GPT-3 not only demonstrated an ability to generate coherent and complex text, but also paved the way for a new class of AI-based applications, such as advanced virtual assistants, automatic writing tools, and code generators. At the financial level, AI-focused companies have seen an explosion of investment. OpenAI, for example, has attracted billions of dollars in funding, while companies such as Google and Microsoft have increased their investments in AI. NVIDIA, a company specializing in AI hardware, has emerged as a key player due to the growing demand for GPUs (Graphics Processing Units) needed to train large-scale AI models.

In November 2022, OpenAI launched ChatGPT, a GPT-3-based application accessible to the general public. This marked a watershed moment in the history of AI, with one hundred million users interacting with the model in the first two months of availability broke records previously held by the TikTok platform of nine months (Figure 2.3). The speed with which ChatGPT has spread has, highlighting how AI technologies are poised to rapidly transform entire economic and cultural sectors. Within months, this new model has been integrated into a wide range of products and services, from search engines to productivity software, demonstrating its versatility and relevance. On the other hand, the disruption it caused in society meant that it quickly became one of the most talked-about

tools in the world, bringing generative AI into the mainstream and stimulating a global debate about its potential applications and risks.

TIME TO REACH 100M USERS
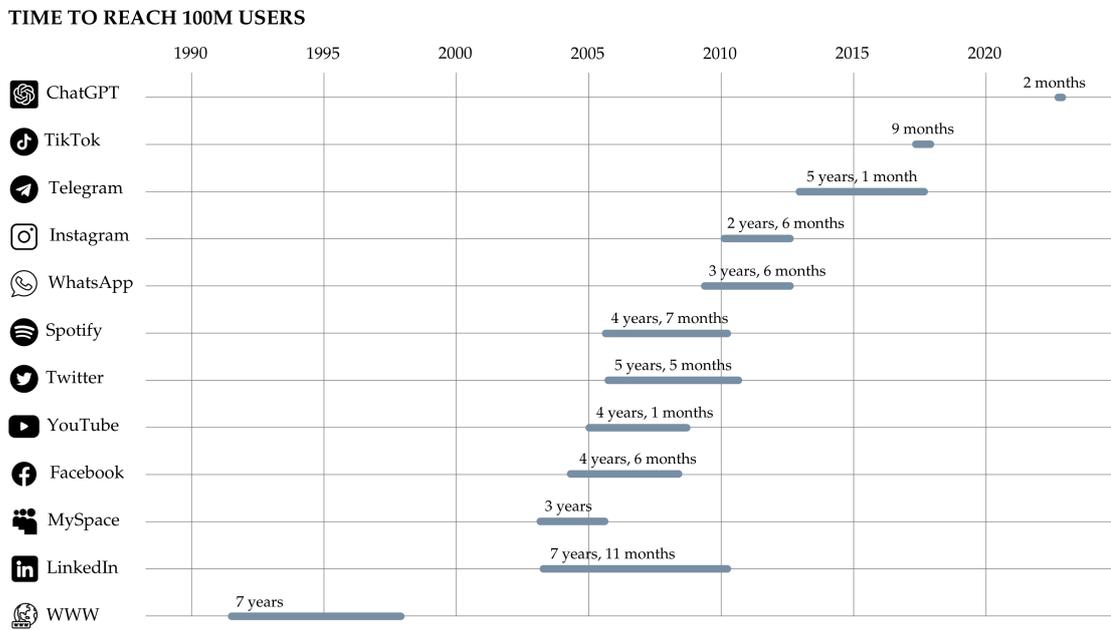
Figure 2.3: Time to reach 100M users.

The following year saw the emergence of new competitors in the field of generative AI. Google launched Gemini, an advanced system that combines NLP technologies with visual content generation capabilities. Other tech giants, such as Baidu and Meta, have developed generative AI models with the goal of competing with ChatGPT and establishing a dominant presence in the AI market. The competition has led to rapid innovation and lower costs of AI technologies, facilitating their adoption in increasingly broad areas.

With the beginning of 2024, the focus has shifted to the next step in the evolution of generative AI: the long-awaited release of ChatGPT-5. This new model promises to be even more powerful and versatile, with significant improvements in its ability to understand and generate natural language, as well as in its ability to integrate multimodal inputs, such as text, images, and video. Investment in AI continues to grow at unprecedented levels, with predictions that AI could become a major driving force in the global economy in the coming decades. Media attention and coverage of new AI technologies is at an all-time high, with ongoing discussions about how these innovations will affect work, education, entertainment, and other aspects of daily life (Oxford University, 2023)(The Economist, 2024).

2.2.3.   The economic impact of AI adoption

Artificial Intelligence represents one of the most transformative innovations of our time, with a significant impact on a wide range of industries and applications. In 2024, AI adoption reached 72 % of organizations globally, marking a substantial increase from previous years when adoption hovered around 50 % for several consecutive years. This rapid increase has been largely catalyzed by the rise of Generative Artificial Intelligence, also known as GenAI, which has seen dramatic growth, with 65 % of organizations reporting that they regularly use GenAI in at least one business function, a %age nearly double the 33 % recorded just 10 months earlier.

The impact of GenAI spans multiple business functions, with particularly effective applications in marketing and sales, as well as in product and service development. For example, in marketing, the adoption of GenAI for campaign personalization and the identification and prioritization of sales leads has led to a significant increase in operational efficiency. In the area of product development, GenAI has facilitated the review of scientific literature and accelerated the early stages of simulation and testing, helping to reduce development time and increase the quality of final products. In this context, an estimated 14 % of organizations using GenAI in supply chain management reported an increase in revenue of more than 10 %, demonstrating the potential of this technology in creating tangible value.

In addition to direct economic benefits, AI is contributing to a profound transformation of business operating models. About 50 % of organizations that adopt AI do so in two or more business functions, a figure that highlights the increasing integration of AI into daily operational processes. This integration not only improves efficiency, but also enables companies to respond more nimbly to changing market conditions. For example, organizations using customized or internally developed AI models are able to implement tailored solutions that specifically address their business needs, thereby increasing their competitiveness.

Artificial Intelligence is generating significant economic benefits in various sectors, contributing significantly to increased productivity and business growth. According to recent research, organizations that use AI strategically are seeing substantial increases in their revenue. For example, in the area of supply chain management, 25 % of companies reported revenue growth as a result of AI adoption, with positive effects not only on revenue but also on resource management and process optimization.

Moreover, AI is not only enhancing productivity but also opening up new opportunities for innovation. Leading technology and professional services companies are investing more

than 20 % of their digital budgets in AI solutions, with a particular focus on generative AI. These investments are fueling the development of new products and services, reducing time to market and improving the customer experience. In this context, 35 % of organizations using generative AI reported significant acceleration in the product development phase, demonstrating how AI can be a catalyst for innovation at scale.

In parallel, AI adoption is also transforming the way companies operate internally. 53 % of companies using generative AI do so with customized or internally developed models, demonstrating the ability to adapt these technologies to specific business needs. This customization not only improves the effectiveness of AI solutions, but also helps create a sustainable competitive advantage. Companies that invest in AI personalization are seeing a direct and positive impact on their operating margins, with an average 15 % increase in EBIT (Earnings Before Interest and Taxes) attributable to AI adoption. This data underscores how AI is not just a technological tool, but a transformative force that, if implemented correctly, can drive sustainable growth and continuous innovation (Chui et al., 2023) (Singla et al., 2024).

2.2.4. The dark side of AI

Artificial Intelligence represents one of the most significant technological innovations of our time, with applications ranging from medicine to industry, from marketing to entertainment. However, despite the promises of efficiency and progress, AI carries a number of downsides that raise important ethical, social and technical questions. This chapter aims to explore these dark sides, focusing on issues such as economic inequality, algorithmic discrimination, impact on privacy, and dependence on autonomous technologies.

One of the most significant negative aspects of AI concerns growing economic inequality. AI technologies, particularly those related to Machine Learning and automation, have the potential to dramatically reduce operational costs and increase productivity. However, these benefits are not distributed equally. Large enterprises with significant resources are able to invest heavily in AI, gaining substantial competitive advantages over small and medium-sized enterprises. This phenomenon can lead to a concentration of economic power in a few hands, fueling global economic inequality. In addition, the automation of work processes, a major application of AI, threatens to eliminate millions of jobs, especially in the manufacturing and service sectors. According to a McKinsey study, the large-scale adoption of AI could lead to job losses for the less affluent classes, further exacerbating socioeconomic inequality. This effect is particularly pronounced in developing countries, where the workforce is most vulnerable to automation.

Taking it for granted that training to achieve increasingly high-performance AI relies on Machine Learning models that ingest from large amounts of data, a serious problem could arise if the training data contain biases. Indeed, these will inevitably be reflected in the results produced by the algorithms, a phenomenon known as algorithmic discrimination, and could have serious consequences in areas such as employment, justice, and health care. For example, automated personnel selection systems could discriminate against candidates on the basis of gender or ethnicity if trained on historically discriminatory data. Similarly, algorithms used in the justice system to assess recidivism risk may perpetuate racial bias, undermining the fairness of decision-making. Algorithmic discrimination not only reproduces existing inequalities but amplifies them, making it even more difficult for marginalized groups to access opportunities for growth and development.

Another issue always related to the massive amount of data required in the AI creation and development process concerns privacy. These often include sensitive personal information whose collection, storage and analysis poses serious risks to the privacy of individuals. Privacy violations can result not only from cyber attacks, but also from the misuse of data by the organizations that collect it. In particular, generative AI and facial recognition systems have raised concerns about mass surveillance. These technologies can be used to monitor and profile individuals without their consent, with significant implications for personal freedom and civil rights. In addition, the ability of AI to aggregate and analyze data from multiple sources increases the risk of de-anonymization, exposing individuals to further risks of privacy violations (Miller, 2024).

The issue of liability becomes particularly complex when an autonomous AI system causes damage, as decisions made by AI may be the result of complex processes that are not directly controllable or predictable by humans. The absence of clear intent (mens rea) on the part of the developers, operators or users of the system creates a loophole in the traditional legal framework, which is based on the attribution of fault and intent. For example, if an AI-based healthcare system provides an incorrect diagnosis, it becomes difficult to determine who should be held liable: one could think of attributing liability to the developer for not having foreseen such a scenario, to the healthcare institution for having entrusted its activity to an automated system, or to the physician who followed the AI's recommendation without adequately assessing the implications. Moreover, the ability of AI to act in ways that exceed the predictions of its programmers makes it even more difficult to determine who is precisely to blame. To address this problem, some proposals suggest the introduction of strict liability for creators and users of AI systems, accompanied by standards that can grant them immunity, provided all safety measures and ethical best practices are observed (Feiler, 2023).

Another controversial aspect of AI concerns the use of copyrighted data for training models. Many companies in the field have been at the center of scandals and investigations because they use, without permission, huge amounts of publicly accessible but copyrighted data, such as newspaper articles, images of works available online, YouTube videos, and podcasts. This raises serious legal and ethical issues, as the authors of this content not only receive no compensation for the use of their works, but also see their copyrights potentially infringed. In addition, the indiscriminate use of such data can compromise the quality and reliability of models, as they often include unverified or biased information. This practice not only undermines authors' rights, but also contributes to a growing distrust of AI technologies and the companies that develop them (Appel et al., 2023).

Finally, the increasing use of autonomous AI systems in critical areas, such as automated driving and health services, raises concerns about safety and reliability. Dependence on these technologies can lead to reduced human expertise and increasing vulnerability to technical failures or cyber attacks. For example, a malfunction in an autonomous driving system can have catastrophic consequences, such as fatal traffic accidents. Similarly, the use of AI in medical diagnostics could lead to misdiagnoses if the system is not properly trained or supervised.

This technological dependence also introduces the risk of loss of human control into the public debate. AI systems designed to optimize complex decision-making processes may make decisions that humans are unable to understand or challenge, reducing transparency and accountability of operations. This scenario could lead to a decrease in human control over critical decisions, with potentially dangerous implications for society.

In general, when dealing with issues related to AI, despite its significant benefits, it is essential to recognize and address its downsides as well. Economic inequality, algorithmic discrimination, invasion of privacy, and dependence on autonomous technologies are just some of the challenges that society faces in the age of Artificial Intelligence. It is crucial that these issues are carefully evaluated and mitigated to ensure that AI can be used fairly and safely for the benefit of all (Zhou et al., 2023).

2.2.5.   AI regulation and governance

Artificial Intelligence has emerged as one of the most transformative technologies of the 21st century, bringing with it extraordinary opportunities but also significant challenges. In response to these challenges, governments, international bodies, and companies are developing and implementing regulatory strategies and governance practices that aim to ensure that AI is used safely, ethically, and in accordance with human rights.

At the governmental level, many nations are introducing AI-specific laws and regulations. The AI Act is a legislative proposal put forward by the European Commission in 2021, designed to establish a harmonized regulatory framework about AI within the European Union. This legislation represents the first attempt to regulate AI in a systematic and large-scale manner, with the goal of ensuring that AI systems are used in a manner that is safe and respectful of fundamental rights, while promoting technological innovation.

There are three main objectives of the AI Act: safety and security of rights, promotion of innovation, and regulatory harmonization. The first goal aims to ensure that the use of AI systems is done in a way that protects people's safety, health and fundamental rights. This includes protection against the use of AI systems that could cause physical or psychological harm to individuals. The second goal, the promotion of innovation, seeks to balance the protection of fundamental rights with the need to incentivize technological development. By establishing clear and proportionate rules, the AI Act enables companies to develop and use AI systems responsibly, without unnecessarily hindering innovation. The third goal, regulatory harmonization, aims to create a digital single market for AI in Europe by eliminating regulatory fragmentation across member states. This is essential to ensure that European companies can compete on a global scale in a clear and uniform regulatory environment.

A distinguishing feature of the AI Act is the classification of AI systems according to the level of risk they pose to the rights and safety of individuals. Systems are divided into four risk categories: minimal, limited, high, and unacceptable. Minimal-risk systems are not subject to specific regulations, with some exceptions, while limited-risk systems are subject to transparency requirements, such as a requirement to inform users that they are interacting with an AI system. Those with high risk, while not prohibited, are subject to very strict regulations, including requirements for transparency, human oversight and risk management. Examples of such systems include those used for personnel selection, credit assessment, and critical infrastructure. Finally, AI systems with unacceptable risk are banned as they pose a significant threat to security or fundamental rights. Specific prohibitions include social scoring systems, which rank people based on their social, economic or other behavior, if these can lead to unfair or discriminatory unfavorable treatment. The use of AI for large-scale indiscriminate surveillance through facial recognition or other biometric technologies in public spaces is also prohibited, with some limited exceptions for reasons of public safety. Another ban covers AI systems that manipulate people in ways that impair their behavior without their knowledge, such as the use of subliminal persuasion techniques that may cause physical or psychological harm (EU Artificial Intelligence Act, 2024).

In parallel, international bodies such as the Organization for Economic Cooperation and Development (OECD) and the United Nations are promoting the adoption of global principles for AI. In 2019, the OECD introduced the Principles on Artificial Intelligence, a set of guidelines for trusted AI that has been adopted by more than 40 member and non-member countries. These principles promote the responsible use of AI, emphasizing values such as transparency, fairness, privacy protection and accountability. The OECD is also working with other international bodies to harmonize these principles with national regulations, thereby facilitating a coordinated approach to AI regulation globally.

The United Nations, through organizations such as UNESCO, is also seeking to establish global standards for AI. In 2021, UNESCO adopted a Recommendation on the Ethics of Artificial Intelligence, a document that aims to guide member states in adopting ethical policies and strategies for AI. This recommendation is important because it recognizes the need for an inclusive and human-centered approach to AI development, promoting a balance between technological innovation and the protection of human rights (Kerry, 2024).

On the corporate front, many companies, especially in the technology sector, are taking a proactive approach to AI governance. Companies such as Google, Microsoft, and IBM have developed internal guidelines and created ethics committees to ensure that their AI systems are developed and used responsibly. For example, Microsoft has established the AETHER (AI and Ethics in Engineering and Research) Committee, an internal body that oversees AI-related initiatives to ensure that they adhere to ethical and legal principles. In addition, these companies actively participate in multi-stakeholder initiatives, working with governments and international organizations to develop industry standards and best practices that can guide the entire technology ecosystem toward the safe and ethical use of AI.

However, despite these efforts, many challenges persist. AI is a rapidly evolving technology, and regulations often struggle to keep pace with innovation. There is a risk that overly strict regulations could stifle innovation, while a lack of regulation could lead to irresponsible uses of AI with potentially serious consequences for society. The future governance of AI will therefore depend on the ability of governments, international bodies and companies to work closely together to create a balance that promotes both innovation and the protection of human rights.

2.2.6. The future of AI and its societal implications

In recent decades, Artificial Intelligence has made significant progress, transforming from a theoretical concept into a tangible and ubiquitous technology. However, the future of AI promises further developments that could redefine entire sectors of the economy and profoundly affect society. This chapter will examine the future developments of AI, with a particular focus on its impact on the world of work and on people's daily lives.

A major long-term goal in the field of AI is the development of Artificial General Intelligence , also known as AGI, a form of AI that possesses full human cognitive capabilities, including understanding, learning, and creativity. While today's AI is designed for specific tasks, AGI would have the ability to perform any intellectual task that a human can perform, potentially surpassing human intelligence in several areas.

The implications of AGI are both promising and troubling. On the one hand, it could accelerate scientific discovery, improve personalized medicine, and solve complex problems such as climate change. On the other hand, AGI raises ethical and security issues, such as the risk of loss of control by humans and the emergence of superintelligent entities that could act independently of human interests.

Self-supervised learning represents another significant development. Currently, most AI models require huge amounts of labeled data for training. However, self-supervised learning algorithms allow models to learn without the need for pre-labeled data, somewhat mimicking the way humans learn from the world around them. This autonomous learning capability could expand the applicability of AI in contexts where data are scarce or unavailable, increasing the versatility and adaptability of intelligent systems.

In the near future, interaction between humans and AI is expected to become more natural and fluid. With the development of technologies such as advanced natural language processing and empathic AI, machines will be able to understand and respond not only to words, but also to emotions and social signals. This advance could revolutionize the fields of customer services, health care, and education by providing personalized experiences that are sensitive to individual needs.

Impact on the employment landscape

AI-powered automation is set to continue to transform the world of work. According to the International Monetary Fund, about 60 % of employees in jobs in advanced economies will experience high exposure to Artificial Intelligence, with sectors such as manufacturing, transportation, and logistics particularly vulnerable. This would mean reduced costs and increased efficiency, but also entail the risk of large-scale unemployment, especially for

workers with skills easily replicated by intelligent machines.

On the other hand, AI can create new job roles and opportunities. New professions are expected to emerge in areas such as AI management, data governance, and AI ethics. In addition, AI may empower human workers, allowing them to focus on tasks that require creativity, intuition, and social interaction. Finally, it can also serve as a complement to, rather than a substitute for, human labor.

The impact of AI on work will require a reformulation of skills. The need for advanced skills in areas such as programming, data analysis, and AI management will increase, requiring significant investment in training and retraining. Continuous learning will become an essential part of working careers, with individuals and organizations needing to adapt quickly to technological changes to remain competitive (Georgieva, 2024).

Implications for everyday life

AI could significantly improve the quality of life through the personalization of services. From content recommendations on digital platforms to personalized health care based on genetic and behavioral data, AI could offer tailored experiences that meet individual needs more precisely than ever before. However, this level of personalization also raises concerns regarding data privacy and security.

It may also affect people's psychological and social well-being. Increased dependence on technology could lead to a reduction in direct human interactions and new types of social alienation. In addition, the introduction of empathic and companion AI raises questions about the nature of human relationships and the emotional impact of interacting with machines designed to simulate empathy.

Future developments in Artificial Intelligence promise to profoundly redefine society, from the world of work to people's daily lives. While AI offers potential extraordinary benefits, such as increased efficiency and the personalization of services, it also raises significant ethical, social, and economic issues. It is therefore essential to address these issues with a critical and informed perspective, ensuring that technological advances are guided by principles that promote the common good (Bryant, 2023).

2.3.   Use of Artificial Intelligence in Human Resources

The use of Artificial Intelligence in Human Resources is profoundly transforming the way companies manage their human capital. This section explores how AI is finding application in different aspects of HR functions, improving the efficiency of processes, the employee experience and the quality of decisions. At the same time, it highlights the need to address the ethical and operational challenges associated with this technology in order to balance innovation with a humane and responsible approach.

2.3.1.   Key applications and areas of impact

This section will examine the key applications of AI in HR processes, analyzing their impact on key areas of HR management, with a focus on recruitment and selection, talent development and learning, and employee engagement and retention.

Personnel recruitment and selection

In the context of staff recruitment and selection, Artificial Intelligence has been implemented to simplify and optimize every step of the process, from the initial identification of candidates to the final evaluation. One of the most popular tools is advanced Applicant Tracking Systems, which leverage AI algorithms to automate the analysis of resumes and select candidates based on the requirements of the role. These systems dramatically reduce the time and resources required to review high volumes of applications, improving the effectiveness of pre-selection processes and ensuring greater consistency in initial assessments (Rathore, 2023).

In addition to ATSs, the use of Machine Learning algorithms has revolutionized the matching between candidates and open positions. Such are able to analyze soft skills and behavioral characteristics by processing a wide range of complex and unstructured data. For example, Machine Learning can examine professional profiles on social networks such as LinkedIn, integrating information beyond stated professional experience and offering a more comprehensive view of a candidate's capabilities (Dastin, 2018).

Another innovative tool that is transforming recruiting is AI-based chatbots, used to interact with candidates early in the selection process. Chatbots are programmed to promptly and accurately answer candidates' questions, schedule interviews, and gather additional information about job skills and preferences. This type of automation improves the candidate experience by providing quick and relevant answers, and also relieves HR teams of repetitive and administrative tasks, allowing them to focus on strategic decisions.

Finally, AI-supported video interviewing platforms are becoming increasingly common. These systems use advanced Natural Language Processing and facial recognition techniques to analyze candidates' video interviews. The algorithms assess verbal responses, tone of voice, facial expressions and body language, providing a more in-depth and objective assessment of a candidate's skills and personal characteristics. The use of these data-driven tools reduces the subjectivity typical of human assessments and contributes to more informed hiring decisions (Nyathani, 2022).

Talent development and learning

Artificial Intelligence is also taking an increasingly central role in talent development and learning processes within organizations. AI-based technologies make it possible to create customized training paths that meet the specific needs of each employee, thereby improving the effectiveness of training and accelerating skill development.

Automated learning systems, also known as Intelligent Tutoring Systems, are able to analyze complex data related to employees' performance, skills, and individual professional goals in order to create tailored training paths. These tools allow training content to be tailored to the specific learning needs of each individual, overcoming the traditional one-size-fits-all approach that characterizes many corporate training initiatives. As a result, learning becomes more relevant to individual employees, resulting in improved performance and greater overall training effectiveness (Amigot, 2024).

AI-based platforms can also continuously monitor employee progress, providing real-time feedback and suggesting additional content or alternative career paths. This proactive approach to continuous learning facilitates faster and more focused professional development, minimizing downtime and providing opportunities for growth in line with business aspirations and needs.

In addition to the personalization of training paths, it is also increasingly being used to identify leadership potential within organizations. Using predictive analytics, AI technologies can analyze performance data, feedback received from peers, and evaluations from superiors to identify patterns that suggest leadership readiness. This type of analysis helps identify emerging talent, but more importantly, it enables more effective succession planning for key leadership roles, helping to build a pipeline of future leaders within the organization.

The adoption of AI-based predictive systems eliminates much of the subjectivity inherent in traditional potential assessment processes. Decisions on promotion and leadership development, based on objective data and patterns identified by AI, become more trans-

parent and justified. As a result, organizations can develop more focused and accurate leadership programs, fostering consistent and strategic development of internal talent (Na, 2024) (Heer and Porskamp, 2019).

Performance management and succession planning

Another area undergoing radical innovation is performance management and succession planning in organizations, offering the ability to make decisions based on objective data and predictive analysis rather than subjective or approximate assessments. This change responds to the growing need for transparency, fairness and efficiency in decision-making, especially in a competitive environment where strategic management of human capital is critical to long-term organizational success. In the area of performance management, AI enables the continuous collection and analysis of complex employee performance data, such as goals achieved, 360-degree feedback, and periodic evaluations. This approach allows AI algorithms to identify patterns of success and, at the same time, highlight areas where improvement is needed, suggesting corrective actions or customized development programs. This continuous focus on data helps foster an organizational culture of continuous improvement, where progress is constantly monitored and employees receive timely and targeted feedback.

In parallel, AI is also revolutionizing succession planning through the use of predictive analytics, AI-based technologies are able to analyze historical employee performance data, as well as peer feedback and social behaviors observed in the company. These sophisticated algorithms are designed to identify behavioral patterns that indicate high leadership potential, suggesting which employees might be ready for roles of greater responsibility in the future. The use of predictive analytics enables more accurate predictions than traditional methods, significantly reducing the risk of error in succession decisions and ensuring seamless business continuity.

Another contribution of AI to talent management is talent mapping based on predictive analytics. AI-driven talent mapping platforms allow organizations to compare employees' current skills with the future needs of the enterprise, facilitating more strategic and targeted human capital management. This tool enables early identification of areas of shortage or excellence, enabling companies to develop skill enhancement plans to close gaps and prepare for future challenges by helping prevent succession crises and improving the company's ability to efficiently allocate Human Resources (Dadheech, 2024).

Compensation and benefits

Artificial Intelligence is bringing significant transformations to the compensation and benefits arena, enabling organizations to manage and optimize compensation packages more efficiently, accurately and transparently. Through advanced data analysis, AI algorithms can benchmark salaries in real time, comparing internal salaries with those offered in the market. This process ensures that salary packages are competitive and aligned with industry trends, helping companies attract and retain qualified talent and preventing the loss of staff to competitors offering more advantageous economic terms (Marler and Boudreau, 2016).

In addition, AI facilitates the personalization of benefits offered to employees. By analyzing workers' individual preferences and specific needs, organizations can create tailored benefit packages, which can include customized health insurance, flexible retirement plans, individualized wellness programs, and other incentives that address each employee's unique needs. This customization increases employee satisfaction and improves employee engagement, as workers perceive a genuine company interest in their personal and professional well-being (Tursunbayeva et al., 2018).

AI-based compensation planning tools optimize compensation setting processes, reducing human error and improving transparency in compensation decisions. These tools use advanced algorithms to predict the impact of salary increases or bonuses on employee performance and engagement levels. By analyzing historical performance data, market trends, and other key indicators, managers can make more informed and strategic decisions. This data-driven approach supports more equitable and meritocratic compensation management, helping to foster a positive and motivating organizational climate (Strohmeier and Piazza, 2015).

Integrating AI into compensation and benefits is therefore a significant competitive advantage. Organizations that adopt these technologies can benefit from increased operational efficiency, higher employee satisfaction, and greater ability to adapt to changing labor market conditions. In addition, using AI in this context promotes transparency and fairness, which are key elements in building trust and loyalty within the workforce (Leicht-Deobald et al., 2019).

Employee Well-being

Artificial Intelligence is also emerging as a crucial tool in promoting employee well-being, enabling companies to proactively monitor and improve the physical and mental health of their employees. Through advanced data analysis, AI-based technologies can iden-

tify potential wellness issues before they result in high turnover, burnout, or decreased productivity (Sorensen et al., 2020).

These platforms use sophisticated algorithms to collect and analyze data from worker surveys, feedback, and digital behaviors. These platforms offer real-time insights into working conditions and can identify areas of risk, such as high levels of stress, dissatisfaction or demotivation. This enables organizations to intervene early with corrective measures or customized support programs. For example, continuous monitoring systems can detect an abnormal increase in absenteeism or a decrease in interaction among team members, potential signs of work distress (Mittal et al., 2023).

Another innovative tool is sentiment analysis through Natural Language Processing techniques. They analyze the language used in feedback, internal communications and corporate social media interactions to assess the level of employee satisfaction and well-being. This approach allows them to identify subtle signs of potential discomfort, stress, or disengagement that might escape traditional monitoring methods. For example, a change in the tone of internal communications or the frequent use of terms associated with stress may indicate the need for targeted interventions.

In addition, the introduction of dedicated wellness chatbots represents a further evolution in individual wellness support. These AI-powered virtual assistants interact with employees by offering personalized advice on how to improve their well-being, suggesting relaxation activities, exercises to manage stress, and promoting mindfulness practices. They can also provide a first level of psychological support, referring employees to qualified resources or professionals when needed. Such immediate and easily accessible support can significantly help reduce the stigma associated with mental health in the workplace. By offering employees resources and tools to proactively address their psychological challenges, organizations foster an environment in which mental health is recognized as an essential component of overall well-being. This approach encourages employees to talk openly about their difficulties without fear of judgment or repercussions, fostering a more empathetic and inclusive corporate culture. Finally, normalizing conversations about mental health can improve team cohesion and increase engagement, as employees feel supported and valued not only for their job performance but also for their personal well-being (Miner et al., 2017).

2.3.2. Benefits of AI in HR Management

The implementation of Artificial Intelligence in Human Resource Management practices is profoundly revolutionizing the way companies manage human capital, bringing numerous benefits in terms of efficiency, accuracy and innovation. One of the main benefits of adopting AI is the ability to process large volumes of data in real time, enabling faster, evidence-based decisions. This capability enables organizations to identify emerging patterns, anticipate future needs, and proactively adapt Human Resource Management strategies, making the company more agile and responsive to changes in the labor market.

In particular, AI's ability to process complex data enables it to improve the accuracy of forecasting and strategic analysis. For example, AI can support workforce planning decisions by identifying emerging skills needed to maintain competitiveness. This enables organizations to anticipate and close any skills gaps through targeted training programs or customized recruitment strategies. This strategic foresight is crucial in a dynamic and competitive environment, where speed of adaptation is a competitive advantage. Another significant benefit of AI is the elimination or reduction of human bias in decision-making processes. AI algorithms, if well designed and trained, provide greater objectivity in personnel selection processes, performance evaluations and promotional decisions. This contributes to a more equitable work environment, reducing unconscious biases that often influence human decisions, and promoting a more diverse and inclusive workforce. Diversity within organizations not only improves equity, but also fosters innovation and creativity, as heterogeneous teams tend to generate more original solutions suited to global challenges.

AI enables also the possibility of streamlined operational processes, freeing HR staff from repetitive and administrative tasks such as interview scheduling, payroll management, and benefits processing. Automations such as these allow HR professionals to focus on more value-added strategic activities, such as talent development, change management and improving employee engagement. This increase in operational efficiency results not only in reduced costs, but also in improved productivity and the creation of a more stimulating and collaborative work environment. An additional benefit of adopting AI in Human Resources is the personalization of learning and professional development. Through the analysis of behavioral data and individual preferences, AI enables organizations to create tailored training paths for each employee, improving the effectiveness of learning sessions. This approach not only increases employee satisfaction, but also fosters a culture of continuous learning, which is critical to keeping skills up-to-date in a constantly changing world of work (Sanyaolu and Atsaboghena, 2022).

AI also offers valuable support in managing organizational well-being. Advanced AI-based tools can continuously monitor employee morale and engagement by analyzing feedback, surveys, and internal communications for signs of stress, dissatisfaction, or declining motivation. This proactive monitoring enables companies to intervene early with corrective measures to improve the work climate, thereby reducing turnover and increasing overall productivity. A focus on employee well-being has become critical to maintaining high levels of satisfaction and loyalty to the company, especially in increasingly complex and diverse modern work environments.

Another significant contribution of AI relates to managing regulatory compliance and reducing legal risks. Advanced algorithms can continuously monitor HR practices to ensure compliance with labor regulations and company policies, identifying potential issues before they become critical. This proactive approach helps organizations avoid legal penalties and maintain a positive reputation in the marketplace, essential factors in ensuring the long-term sustainability of the enterprise. Finally, AI brings significant benefits in improving internal communication. Automated systems can facilitate the dissemination of personalized and timely information to employees, improving organizational alignment and strengthening team cohesion. This increase in transparency and participation contributes to greater employee engagement, resulting in a more collaborative and success-oriented corporate culture (Wilson, 2018).

2.3.3.   Challenges and ethical considerations

The implementation of AI in Human Resource Management practices is raising numerous challenges and issues that organizations must address to ensure ethical, effective and transparent use of these advanced technologies. Although AI offers significant advantages in terms of efficiency and accuracy, its integration into the field of Human Resources is not without its complexities and risks, especially with regard to bias, privacy, and human interaction.

One of the most critical issues is the risk of algorithmic bias. AI algorithms, although designed to eliminate human biases, can still reproduce or even amplify the biases present in the data used to train them. For example, if the historical data on which personnel selection decisions are based contain gender or racial bias, AI could perpetuate such inequities, leading to unfair and, in some cases, legally problematic decision-making. This means that AI systems must be carefully monitored and updated to ensure that they do not reproduce pre-existing discriminatory dynamics, a task that requires advanced technical expertise and significant resources. This risk highlights the need for transparency

and human oversight in the operation of algorithms so that they are able to produce fair and unbiased results.

Another relevant issue concerns employee privacy. The adoption of AI in HR involves the collection and analysis of a vast amount of personal data, including sensitive data related to work behavior, internal communications, and even individual preferences. This raises serious data protection and privacy concerns, especially considering that many organizations do not have adequate security systems in place to protect such information from misuse or breach. Moreover, the use of AI tools to monitor employee morale and engagement can be perceived as a form of intrusive surveillance, with the risk of creating a climate of distrust and anxiety among workers. Therefore, companies need to adopt clear and transparent policies on the use of personal data, ensuring that employees are informed and consenting about the monitoring and analysis of their activities.

The technical complexity associated with AI implementation is another significant barrier for many organizations. Integrating AI solutions with existing HR systems often requires extensive customization and constant attention to software maintenance and upgrades. Small and medium-sized companies, in particular, may not have the resources or expertise to effectively implement and manage these technologies, which could hinder the success of AI projects. In addition, data quality is a crucial element: incomplete, unstructured or outdated data can compromise the accuracy of AI analysis and predictions, limiting its potential to support data-driven strategic decisions.

The lack of transparency in AI decision-making processes is another major issue. The complex algorithms underlying AI solutions often operate as "black boxes," making it difficult for HR managers to understand how and why certain decisions were made. This poses a challenge in terms of both accountability and acceptance by employees, who may feel excluded from crucial career decisions. Lack of clarity can also undermine employee trust in AI technologies, especially in sensitive processes such as personnel selection and performance appraisals. Therefore, it is essential that organizations invest in AI tools that ensure an adequate level of transparency and that HR teams maintain an active role in overseeing and validating decisions made by algorithms.

From a cultural perspective, the introduction of AI in HR can face significant resistance from employees. The idea that important decisions regarding hiring, promotion, or performance management will be entrusted to machines rather than humans may raise fears related to job security and loss of control. In addition, many HR professionals may feel threatened by increasing process automation, perceiving AI as a threat to their traditional roles. Addressing this resistance requires an inclusive and transparent approach

that clearly explains how AI can complement human work, rather than replace it, and how it can improve decision-making through support for HR professionals.

Legal implications are another critical aspect to consider. AI tools used in HR must comply with existing data protection and equal treatment regulations. Errors or discriminatory decisions made by an algorithm could expose the company to significant legal risks, resulting in penalties and reputational damage. Organizations must therefore ensure that AI tools are designed and used in compliance with regulations, and that AI-based decision-making processes are subject to strict controls to avoid errors that could lead to litigation.

Finally, AI also has inherent limitations in understanding human behavior. Although it can analyze large volumes of data and identify complex patterns, AI cannot fully grasp the nuances of human relationships, such as emotional intelligence or conflict management skills. Decisions that require a deep understanding of interpersonal dynamics or individual motivations therefore remain beyond the reach of AI. This underscores the importance of maintaining human involvement in strategic decisions, especially in work settings where soft skills and group dynamics are central to organizational success (Sanyaolu and Atsaboghena, 2022).

2.3.4. The importance of Key Performance Indicators

The measurement of Key Performance Indicators is a crucial aspect of Human Resource Management, as it enables organizations to understand the effectiveness of investments made and to monitor the results achieved over time. In an environment of rapid technological change, such as the introduction of Artificial Intelligence into HR processes, the accurate measurement of KPIs becomes critical to assess not only operational efficiency, but also the return on investments made. Only through a clear understanding of KPIs is it possible for HR managers to determine whether resources are being allocated optimally and whether the tools implemented, such as AI, are generating the desired results.

Measuring KPIs enables companies to objectively quantify improvements and critical issues in their HR processes, providing an evidence base that can guide strategic decisions and future operations. This approach allows organizations to identify inefficiencies early and intervene with targeted solutions, as well as confirm the validity of implemented strategies.

Through a review of academic and grey literature, it was possible to highlight the most commonly measured KPIs in HR. Table 1 lists the main KPIs, divided according to the HR processes to which they relate, and for each indicator a detailed description and formula

for calculation has been provided. This classification provides a comprehensive and useful overview to better understand how companies are monitoring their HR processes and what aspects they consider priorities in measuring their performance.

Throughout this thesis, the topic of KPIs will be further explored with the goal of analyzing how companies are using these indicators in the age of Artificial Intelligence. Specifically, through interviews with HR experts and a survey, it will be explored whether and how companies are tracking changes in KPIs as a result of AI adoption. These research tools will provide insight into how organizations are measuring the effectiveness of AI and whether they are observing tangible improvements in HR processes. It will be interesting to investigate the extent to which companies have adapted their measurement approaches and whether they are using new KPIs or reformulating existing ones to better capture the results from implementing advanced technologies (Randstad Market Intelligence, 2024).

3 | Research methodology and research frameworks

In this study, considering the rapidly changing context and the innovative nature of the subject matter, a complex and multidisciplinary methodology was adopted, combining qualitative and quantitative approaches. This methodology allowed the exploration of both academic and nonacademic sources, with the aim of outlining as comprehensive a picture as possible of the state of the art in the use of AI-based solutions within Human Resource Management processes, with a particular focus on the Italian context. The analysis of existing literature made it possible to identify knowledge gaps and areas of interest that have not yet been adequately explored, upon which the research objective was defined.

The literature review was conducted following a process structured in three main phases. The first phase involved a preliminary qualitative analysis, consisting of an academic search and a parallel exploration of nonacademic sources. Academic research was carried out through a systematic analysis of existing scientific literature, in order to critically evaluate the state of the art and identify any gaps. This phase enabled the construction of a solid and reliable theoretical foundation.

In parallel, an analysis of non-academic sources, commonly identified as grey literature, was conducted to enrich the coverage of the topic discussed, considering that the emerging dynamics in a still under-explored field may not be fully reflected in the more traditional academic literature. The combination of these two methodologies enabled the development of an in-depth understanding of the theoretical and application context of Artificial Intelligence in Human Resources.

The second phase involved a quantitative analysis, aimed at answering one of the main objectives of the research, which was to answer the first research question (RQ1) through the collection and analysis of structured data. This quantitative methodology enabled the identification of patterns and trends in the application of Artificial Intelligence within HR.

The third phase was devoted to qualitative methodology, with the aim of answering the second research question (RQ2). In this phase, interviews were conducted with HR experts, aimed at validating and deepening the results obtained in the previous phases, providing a more detailed perspective.

3.1.   Literature review methodology

The methodology adopted for conducting the literature review was based on a systematic and rigorous approach aimed at ensuring relevant and up-to-date coverage of the central themes of this thesis. The search for scholarly contributions was conducted through the Scopus and Google Scholar platforms, selected for their broad coverage of scholarly sources and reliability of indexed publications, doing a targeted search based on keywords chosen to cover all topics of interest.

Initially, the search focused on the field of Human Resources. Specific keywords such as "HR," "Human Resources," "Evolution of Human Resources," and "Future of HR" were used in order to identify studies that analyzed the historical evolution of HR practices, emerging trends, and future prospects for the field.

The research then focused on Artificial Intelligence more broadly. Keywords such as "AI," "Artificial Intelligence," "Evolution of AI," "Impacts of AI," "Regulations of AI," "The Future of AI," and "Implications of AI" were used. This allowed us to get an in-depth overview of the world of AI, including both technological and ethical and regulatory aspects.

Subsequently, to explore the integration of Artificial Intelligence in the context of Human Resources, keywords such as "AI in HR," "Limitations of AI in HR," and "Benefits of AI in HR" were employed. This approach enabled the identification of studies examining how AI is influencing HR practices, highlighting both opportunities and challenges associated with its implementation.

In addition, the scope of Key Performance Indicators in the HR context was explored to assess how companies were measuring the impact of implementing these technologies. The keywords used included "KPIs in HR," "KPIs in Human Resource Management," and "Measurement of Performance in HR."

Once the articles were collected through the above keywords, a rigorous selection process was applied to ensure the quality and relevance of the sources. For each search conducted, the articles were sorted according to the number of citations, and the abstracts of the top 20 most cited articles for each search were examined, selecting those that were most

related to the field of interest of the thesis work.

Another aspect taken into consideration was the year of publication to ensure that the most recent trends and latest innovations were adequately represented. This ensured that the review reflected the current state of research, including both key historical contributions and more recent studies addressing more contemporary developments in the topics covered.

In parallel, the technique of "snowball sampling" was employed, which involves analyzing the bibliographic references of the selected articles to identify additional relevant sources. This methodology broadened the scope of the search, allowing for the inclusion of studies that had not emerged in the initial search but were of significant importance to the topics discussed. Through the analysis of citations and references in the most influential works, additional key contributions were identified, enriching the theoretical framework and offering diverse perspectives on the issues under consideration.

In the final stage of the research, attention was turned to the analysis of specific processes within Human Resources that were chosen as central and will be explained in section 3.4. The keywords "Attraction," "Learning & Development," "well-being," "Employer Branding," "Recruitment," "Selection," "Career Growth," "Feedback Management," "Training," "Employee well-being," and "Engagement" were used.

Through this articulated methodological approach, a total of 91 articles were identified and analyzed, divided into: 50 concerning Human Resources (published between 1984 and 2024), 12 concerning Artificial Intelligence (published between 2023 and 2024) and 29 concerning the application of AI in HR sector (published between 2009 and 2024).

The literature review structured in this way identified some gaps in the existing literature, highlighting areas of knowledge that have not been adequately explored and would be interesting to investigate further. These knowledge gaps formed the basis for formulating the research questions that will be explored in depth in the following chapters, guiding the direction of the research.

3.2. Grey literature

To broaden understanding of the topic and gain a more comprehensive and up-to-date view, academic research has been supplemented with grey literature. This includes unconventional sources such as industry reports, case studies, technical papers, white papers and institutional publications available online. The use of grey literature proved particularly valuable in the initial phase, allowing us to familiarize ourselves with the topic and identify emerging trends and innovative practices in the field of Artificial Intelligence applied to Human Resources. As the topic under study is highly innovative and rapidly evolving, much relevant information has not yet been covered in depth in traditional academic journals. Therefore, sources available on the Internet were relied upon, offering a wide range of up-to-date data and practical insights. This approach enriched the analysis with diverse perspectives, including real application experiences and contemporary discussions.

3.3. Literature gaps, research objective and questions

The literature review clearly indicates that the subject of this thesis is situated within a highly innovative and rapidly evolving context. This ongoing transformation makes it challenging for academic research to provide exhaustive coverage, as it may struggle to keep pace with the sector's changes, especially in more specific and technical aspects.

Academic literature predominantly focuses on international contexts, offering a cross-cutting perspective on the topic. For this research, however, it was deemed important to delve deeper into the specific Italian context to capture more deeply the local dynamics and peculiarities in the adoption of these technologies.

Moreover, the academic literature tends to focus on international contexts, offering a global perspective of the topic. In this research, focus was placed on the Italian context to better capture local dynamics and specificities in the adoption of these technologies. Even when available, in fact, the literature on the topic is rather limited and often lacks in-depth analysis, highlighting a significant knowledge gap. This situation presents a challenge to both researchers and practitioners in Italy who are committed to filling these gaps to fully exploit the potential of emerging technologies in Human Resource Management.

In addition to the gaps in the literature on emerging technologies, there is a significant lack of objective measurement in business performance within HR. Many companies do not adopt tools and metrics to assess the impact of AI in HR processes, despite the availability of appropriate methodologies. This deficiency can be attributed to several factors, includ-

ing an organizational culture less focused on measurement, a poorly structured internal framework, or challenges in identifying the most relevant KPIs. This situation limits organizations' ability to quantify the benefits of AI in terms of efficiency, productivity, and process optimization, thereby hindering a comprehensive impact assessment.

Based on these identified gaps in the literature, the following research objective was defined:

Research Objective (RO): Examine the state of the art of innovative AI-based solutions applied to Human Resource processes and evaluate their impact within Italian organizations.

This objective was further specified through the following research questions:

Research Question 1 (RQ1): What are the innovative trends in the international market for AI-based solutions applied in the HR processes?

Research Question 2 (RQ2): What are the impacts of the implementation of AI-based solutions on Human Resource processes within Italian organizations and what are the main barriers to their effective adoption?

The formulation of these research questions allowed for a comprehensive investigation of the supply side, represented by producers of AI-based solutions, through the first research question. Subsequently, the focus shifts to the demand side, examining the buyers and users of these solutions, with particular attention given in the second research question to the measurement of impact within organizations.

The subsequent chapters will present the methodology employed to address these research questions.

3.4.   Research scope

The following section outlines the scope of the research and presents the methodology used to select the processes and macro processes upon which this thesis is based. The geographical scope of the study is also defined, along with an in-depth examination of the Artificial Intelligence categories identified by the Artificial Intelligence Observatory of the Politecnico di Milano. These categories will serve as the conceptual foundation for the development of the frameworks designed to address the previously formulated research questions.

3.4.1.   Geographical scope

This thesis aims to analyze the state of the Italian market for Artificial Intelligence solutions applied to Human Resource Management processes, starting with an international analysis to identify the most innovative trends. Subsequently, the usage and impact of these solutions within HR processes in Italian organizations are examined, with the goal of exploring a context that is still relatively immature and under-researched.

This approach is motivated by two primary reasons. First, there is a lack of specific literature that thoroughly addresses these topics in the Italian context. Most existing studies tend to focus on international cases, leaving a knowledge gap concerning the unique characteristics and challenges of the Italian market.

Second, collaboration with the HR Innovation Practice Observatory at the Politecnico di Milano provided a valuable opportunity to analyze innovation within the HR sector in Italy. The Observatory plays a crucial role in monitoring and analyzing innovative practices in key sectors across the country, offering a privileged perspective on emerging trends and best practices adopted by Italian organizations. This collaboration enabled access to exclusive data and in-depth insights, enriching the research with current and relevant information.

3.4.2.   Criteria for selection of macro processes

An essential aspect for understanding this dissertation concerns the identification and analysis of the specific processes of the HR function selected for investigation, as well as the methodological criteria adopted for such selection.

As extensively introduced in the chapter 2 of this study, HR functions span a wide range of operational domains, including staff recruitment, training and professional development,

performance analysis and feedback, compensation and benefits management, as well as the promotion of employee welfare. Each of these functional areas is in turn composed of numerous ordinary processes, which highlights the complexity and criticality of HR activities for modern organizations, as discussed in Chapter 2. For this specific study, a targeted selection of a few specific areas was made in order to allow for a more in-depth and detailed analysis.

The research scope is directed toward specific aspects of the employee lifecycle within the organization. In particular, three main areas of interest have been identified: employee attraction and onboarding, professional growth and development, and, finally, the well-being and engagement conditions that influence employee retention. These themes guided the selection of what are referred to as macro processes—defined as aggregates of HR functions that share a common purpose—and the specific processes within them.

3.4.3.   First macro process: Attraction

The first macro process identified in this study is called *Attraction* and is the initial point of contact between an individual and an organization. Attracting candidates is one of the main challenges that companies face in attracting qualified individuals, especially in an increasingly competitive market environment. Without an effective attraction strategy, an organization may find it difficult to detect and acquire the talent essential to support its growth, innovation and responsiveness to market challenges. A shortage of talent candidates can lead to a deficit in essential skills, thereby limiting the organization's ability to achieve its strategic goals.

In the *Attraction* macro process, numerous activities are managed by the HR department. However, for the purposes of this thesis, these activities have been grouped into three key processes: *Employer Branding*, *Recruitment*, and *Selection*. The choice to focus on these three key processes is motivated by their strategic importance, which is widely recognized in the literature. These processes represent the pillars of organizations' ability to attract qualified talent, especially in an increasingly competitive environment. In particular, the adoption of Artificial Intelligence technologies has significantly transformed these areas, improving the effectiveness and efficiency of HR activities at every stage.

In the case of *Employer Branding*, AI enables organizations to build and promote a strong and attractive corporate image, thereby increasing their visibility and reputation in the labor market (Kot et al., 2021).In *Recruitment* and *Selection* processes, on the other hand, Artificial Intelligence helps improve the accuracy of selections by reducing cognitive bias and automating many of the screening activities, making the process more targeted and

objective (Tambe et al., 2019).

These three processes thus form the core of the talent attraction strategy and are also where AI solutions have been shown to offer the greatest added value, both in terms of effectiveness in candidate selection and in positioning the company as an employer of choice.

A detailed analysis of each process is presented below.

Employer Branding

Employer branding is a crucial strategy in Human Resource Management that aims to promote and enhance a company's reputation as an employer in the eyes of potential and current employees. This strategy is based on creating and communicating a positive image of the company, highlighting the values, organizational culture, and career opportunities offered, to attract and retain high-quality talent. Employer branding is realized using various communication channels, such as social media, recruitment platforms, and targeted marketing activities.

From a business growth perspective, effective employer branding proves to be of great importance. A strong and widely recognized brand significantly helps to reduce recruitment costs, as it spontaneously attracts qualified candidates, and to decrease staff turnover by improving employee retention. Through the promotion of a strong employer image, the company can thus accelerate its growth, leveraging a virtuous circle of talent attraction, retention of a motivated workforce, and, as a result, improved overall performance.

Recruitment

In this thesis, *Recruitment* is understood solely as the set of actions involved in identifying potential candidates for vacant positions. This preliminary phase of the hiring process includes several crucial activities: drafting job descriptions that outline the required skills and experiences; candidate profiling, which involves analyzing résumés to match candidate skills with role requirements; and talent sourcing through job platforms, social media, or candidate databases.

From an organizational perspective, effective recruitment is essential to ensure a steady flow of qualified talent in the hiring pipeline. A proactive recruitment strategy enables the company to anticipate staffing needs and significantly reduce the time required to fill vacant positions. This not only enhances the company's ability to respond quickly to market opportunities and operational challenges but also reduces indirect costs associated with understaffing. Furthermore, a well-orchestrated sourcing process elevates the company's reputation as a desirable employer, thereby increasing its appeal to top talent

and strengthening its competitive position in the long term.

Selection

Personnel selection represents an indispensable stage in the Human Resource Management process, essential to ensure the recruitment of candidates who are not only qualified but also compatible with the specific values and needs of the organization. This stage is distinguished by its complexity and requires the implementation of various assessment tools and methodologies, such as structured interviews, tests of specific skills, behavioral analyses, and group assessments. Within this context, the selection process typically begins by conducting preliminary interviews, aimed at skimming candidates based on the minimum requirements of the role. This is followed by more in-depth interviews that aim to explore in detail the candidates' technical and interpersonal skills. These interviews may be supplemented by practice tests or simulations of specific job tasks to directly assess candidates' abilities in real work settings. The selection process also includes assessment of the candidate's cultural compatibility with the organization.

The contribution of an effective selection process to corporate growth is indisputable. By carefully selecting candidates who not only meet the technical requirements of the role but also align with corporate values, organizations can significantly increase the likelihood of success and long-term retention of new hires. This not only improves internal cohesion and operational efficiency, but also reduces the costs associated with staff turnover and re-selection, thus directly contributing to the company's stability and sustainable growth.

3.4.4. Second macro process: Learning & Development

The second area of research, known as *Learning & Development*, is identified as the main driver of growth and innovation within an organization. In an economic and technological landscape characterized by rapid transformations, it is essential to develop and maintain employees' skills to ensure the long-term sustainability of the enterprise. Continuous learning and professional development not only enhance individual skills but also foster the creation of a resilient and adaptable workforce capable of meeting upcoming market challenges. Training is also crucial for promoting appropriate career progression which, when combined with effective feedback management, is essential for maintaining a stimulating work environment.

A company policy that encourages professional advancement and provides regular, constructive feedback contributes significantly to motivating employees, thereby improving their engagement and operational effectiveness. This macro process is divided into three main processes: *Career Growth*, *Feedback Management*, and *Training*. The choice to focus

on these three processes is motivated by their recurrence in the scholarly literature, which highlights their strategic impact on organizations' ability to attract, develop, and retain talent. Numerous studies point out that these processes are critical to creating a continuous learning environment and a growth-oriented organizational culture, both of which are essential to sustaining a company's competitiveness and adaptability over the long term (Noe et al., 2014). Ongoing training and skill development help improve employee effectiveness and build a resilient workforce, while regular and constructive management of feedback fosters employee engagement and motivation, aspects crucial to successful HR practices (Cascio, 2018) (Aguinis, 2019). Thus, these three processes emerge as strategic levers within the *Learning & Development* macro process, and represent the areas in which targeted investment can have significant effects on improving business performance and the attractiveness of the organization as a workplace.

Career Growth

Career Growth represents a crucial function within the Human Resources department and focuses on managing and planning the career advancement of employees. This process involves the systematic identification of employees' skills, aspirations and potential to align them with the organization's needs and strategic goals. Through careful decision making this process aims to achieve career progression in a structured and meritocratic manner.

In recent years, however, the approach to professional growth has evolved. Alongside the traditional vertical career paths, which involve hierarchical promotions, alternative paths, both transversal and horizontal, are developing that allow employees to grow professionally through the acquisition of skills in different areas or through roles that enrich their experience. This diversification of growth paths offers employees a more comprehensive and challenging view of their future within the organization, adapting better to the changing needs of the work environment and personal aspirations.

The effective management of career advancement is of paramount importance in promoting business growth. It not only helps to optimize the use of Human Resources in accordance with corporate goals, but also stimulates employee engagement and motivation. A clear and transparent career plan not only reduces employee turnover and dissatisfaction, but also helps to attract high-profile talent who value career opportunities as key parameters when choosing their workplace. Career growth opportunities are closely linked to retention of top talent and building strong internal leadership. When employees see prospects for career advancement and feel that the organization invests in their development, they are more motivated to stay and contribute to the company's success.

In addition, investing in employees' professional development strengthens the corporate culture and promotes a climate of continuous learning, elements that are indispensable for innovation and adaptability in a constantly changing market.

Feedback Management

Feedback Management is a crucial component within human resource strategies, essential for stimulating continuous professional development and maintaining a collaborative work environment. This process is not only limited to the collection and analysis of feedback related to professional goals, but also includes the management of day-to-day interactions between colleagues and between employees and managers. The function of feedback management goes far beyond simple performative evaluation; it acts as a dynamic mechanism for reinforcing competencies, correcting performance, and recognizing successes.

Effective feedback management can lead to several tangible benefits for a company. First, it fosters a climate of transparency and openness, which can result in increased mutual trust and job satisfaction. Second, it facilitates the alignment of individual goals with corporate goals, thereby optimizing resources and maximizing results. Finally, a well-structured feedback system can serve as a fundamental tool to stimulate and entice employees to engage in training and development, actively contributing to the refinement of their skills and the resulting growth of the organization.

Training

Employee training is a fundamental pillar in Human Resources management, essential for supporting and developing the competencies of employees within an organization. This process encompasses a broad spectrum of educational activities, ranging from orientation programmes for new recruits to advanced sessions for management, including workshops on technical and interpersonal skills. The focus of training is to prepare employees not only to perform their current tasks more effectively, but also to possible promotions and future roles that require greater responsibility. A crucial aspect of training is also the continuous development of employee skills, preventing the risk of obsolescence in a constantly changing labor market. Investing in continuous development enables the organization to keep a workforce up to date with respect to new technologies, methodologies and industry trends.

Investing in training proves to be a decisive strategy for increasing company competitiveness.This is because a well-trained team is generally more productive, responsive to market developments and capable of integrating new technologies. Additionally, appropriate training programmes raise employee motivation and satisfaction, factors that,

like others, contribute to reducing turnover and improving the corporate climate. These aspects, in turn, attract high-profile talent, who often evaluate the opportunities for professional growth offered by a company before joining it. Finally, ensuring that employees are constantly updated on the latest market innovations is essential to prevent a skills shortage within the company, a situation that could erode its competitive advantage. Thus, training not only facilitates the personal development of individual employees, but also stimulates the sustained growth of the entire organization, promoting a culture of continuous improvement and innovation.

3.4.5.   Third macro process: Well-Being

As previously introduced, *Employee Well-Being* has been identified as a crucial factor that significantly impacts productivity, creativity, and employee retention within an organization. This understanding has motivated the inclusion of this topic within the present thesis. In recent years, attention to employee well-being has seen steady growth, as the future work environment is expected to become increasingly complex and potentially stressful. Consequently, companies are called upon to ensure working conditions that promote the physical, mental, and emotional well-being of their staff. A continuous commitment to employee well-being not only enhances the quality of their personal lives but also positively influences their professional performance.

Employee well-being is therefore a holistic concept encompassing various aspects of employees' working and personal lives. This term includes not only physical health, but also the psychological, emotional and social well-being of individuals. Supporting employee well-being means creating a working environment that values mental health, promotes a work-life balance and offers ongoing support through policies such as flexible working hours, psychological care and physical well-being programs.

Investing in employee well-being brings significant benefits: it directly increases job satisfaction and efficiency, reduces stress and promotes greater resilience and ability to concentrate. At the same time, an environment where well-being is prioritised and engagement is promoted contributes to strengthening the corporate image, making the organization attractive to both internal and external talent, and reducing turnover and the costs associated with replacing staff. An active commitment to promoting well-being, including a high level of engagement, creates a collaborative and innovative working environment with strong interpersonal relationships and increased employee motivation.

3.4.6.   Artificial Intelligence Observatory Classes

Another fundamental element used in this thesis is the categorization of the solutions studied into classes of Artificial Intelligence. This categorization was developed by the Artificial Intelligence Observatory of the Politecnico di Milano and serves as the conceptual foundation for the analyses conducted, providing a coherent structure for examining various AI applications and their impact on the HR sector.

According to the Observatory's study, the AI market in Italy reached a total value of 760 million euros in 2023, marking a 52 % increase compared to the previous year. Of this amount, 69 %, or 526 million euros, was commissioned by Italian companies, demonstrating the growing interest and commitment to AI adoption, while the remaining 31 %, amounting to 234 million euros, represented project exports. These data provided the basis for defining the boundaries and descriptions of individual AI classes used in this study, facilitating a structured analysis of the main areas of application and adoption dynamics. Figure 3.1 shows the class breakdown based on Italian market data.

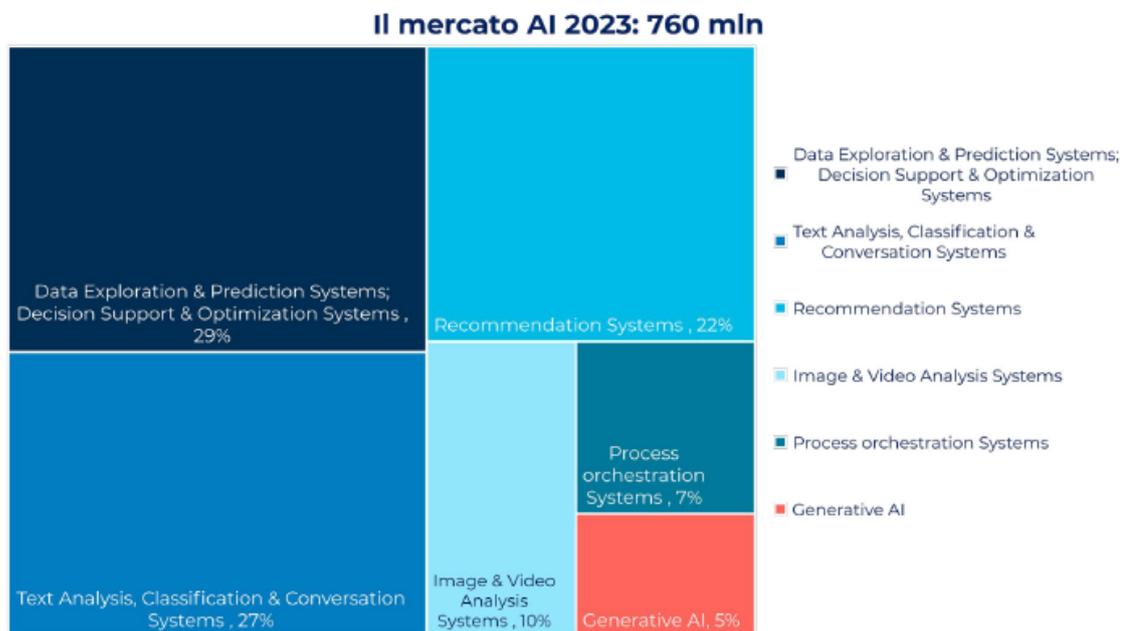Figure 3.1: Classification of Artificial Intelligence in italian market in 2023.

The main areas of application for Artificial Intelligence, according to the taxonomy drawn up by the Artificial Intelligence Observatory of the Politecnico di Milano, cover a wide range of sectors, each characterised by a different degree of market penetration.

In first place in terms of relevance are *Data Exploration*, which account for 29 % of

the overall AI market, down slightly from 2022, when they held a 34 % share. These systems offer advanced applications, such as predictive maintenance, demand forecasting and supply planning, enabling businesses to optimize their operations and improve overall efficiency.

Another important area are *Text Analysis* systems, which cover 27 % of the market. These systems find application in tasks such as sentiment analysis, used for social media analysis, ticketing and marketing strategies. A significant example is the automatic sorting of e-mails and documents, which helps to improve the internal operational efficiency of organizations by facilitating often repetitive processes.

Recommendation System cover 22 % of the AI market and confirm the growth trend recorded in recent years. These systems are widely used in sectors such as e-commerce, media and social media, offering customized recommendations to end users and thus improving their overall experience. The ability of these systems to optimize interactions with consumers has become crucial for customer loyalty and the personalization of services offered.

Image & Video Analysis occupy a 10 % share of the market and are distinguished by their ability to be used in contexts such as anomaly or defect detection in production processes, action detection in videos and voice recognition in security contexts. These systems are assuming an increasingly strategic role in sectors such as manufacturing and surveillance.

Process Orchestration Systems, although representing only 7 % of the market, play a key role in the intelligent coordination of business operations. These systems enable the integration and optimisation of different operational sections within business processes, improving efficiency and reducing operational bottlenecks.

Finally, *Generative AI*, which currently covers 5 % of the market, represents one of the most promising emerging areas. Relevant examples of this technology include chatbots based on Large Language Models (LLM), such as ChatGPT and Gemini, as well as tools for automatic image and video generation, such as MidJourney and DALL-E. These technologies are revolutionizing the creative and communication sectors, offering new ways of producing visual and textual content at an unprecedented speed and accuracy, opening up new perspectives for the future of creativity and automation in content production (Osservatorio HR Innovation Practices, 2024b)(Osservatorio Artificial Intelligence, 2024).

3.5.   Frameworks definition

After identifying the gaps in the existing literature, precisely defining the objectives, boundaries and research questions, presenting the Artificial Intelligence classes of the Artificial Intelligence Observatory of the Politecnico di Milano and detailing the selection criteria for the macro processes and processes on which the study is based, it was possible to undertake a preliminary analysis in which conceptual frameworks were developed to structure the research in a systematic and coherent approach.

At this stage, conceptual frameworks were developed to structure the research in a systematic and coherent manner. The frameworks will be examined in the following sections, offering an in-depth view of their purpose and mode of application in the research context.

3.5.1.   AI Solutions mapping and taxonomy

To analyze the state of supply in the global market for AI solutions applied to Human Resources, a preliminary exploratory analysis was conducted with the aim of developing a framework containing as comprehensive a taxonomy as possible of the families of AI solutions currently available, along with the relevant class of Artificial Intelligence employed.

The term 'AI solution families' refers to a set of technology applications that share the same AI-based technology core, aimed at pursuing a common goal.

The creation of the taxonomy was divided into two main phases. The first phase involved compiling the most comprehensive possible list of AI technologies currently in use globally. Subsequently, in the second phase, the "AI solution families" were defined, each associated with a specific class of Artificial Intelligence, resulting in a structured and coherent taxonomy.

Regarding the first phase, since the application of AI technologies in the Human Resources sector is a highly innovative and rapidly evolving area, the available literature is still limited. Consequently, a thorough search through online sources was conducted in order to obtain as up to date an overview of existing technologies as possible.

The research focused specifically on solutions offered by vendor companies in the industry to obtain a clear and representative picture of the applications currently available in the global market. The decision to focus on solutions from vendor companies is motivated by the need to examine the most relevant commercial offerings, as these solutions are the gold standard for many organizations and contribute greatly to the direction of technology

development in the HR sector.

The research was conducted between April 13, 2024, and May 20, 2024, using specific keywords selected based on the macro processes and processes of research interest. These keywords were chosen with the aim of ensuring comprehensive coverage of AI technologies applied to various HR domains, thus allowing for the systematic identification of the most relevant and up-to-date solutions present globally. The research was conducted in English to ensure as unbiased an approach as possible, as most international vendors use English on their websites. This provided access to a wide range of information from global vendors, expanding the scope and representativeness of the results.

The search strings used to identify AI vendors for HR were defined based on the relevant macro processes, as outlined below:

- **Macro Process: Attraction**
  For the *Employer Branding* process, the strings used were: "Human Resources, Artificial Intelligence, Employer Branding" and "HR, AI, Employer Branding."
  For *Recruitment*, the strings used were: "Human Resources, Artificial Intelligence, Recruitment" and "HR, AI, Recruitment" (alternatively, Recruiting).
  For the *Selection* process, the strings used were: "Human Resources, Artificial Intelligence, Selection" and "HR, AI, Selection."

- **Macro Process: Learning & Development**
  For *Career Growth*, the strings used were: "Human Resources, Artificial Intelligence, Career Growth" and "HR, AI, Career Growth."
  For *Feedback Management*, the strings used were: "Human Resources, Artificial Intelligence, Feedback Management" and "HR, AI, Feedback Management."
  For *Training*, the strings used were: "Human Resources, Artificial Intelligence, Training" and "HR, AI, Training."

- **Macro Process: Well-Being**
  For this *Employee Well-Being*, the search strings included: "Human Resources, Artificial Intelligence, well-being Solutions," "HR, AI, well-being," "HR, AI, Engagement," and "Human Resources, Artificial Intelligence, Engagement."

For each keyword string, only solution vendor websites were consulted, excluding articles or sources from trade journals, and limiting the analysis to results found in the first two pages of the Google search engine. Once the vendor site was located, all proposed solutions were examined, carefully analyzing the descriptions and information available.

The term "vendors" refers to companies or suppliers that develop and market AI-based solutions intended for use in Human Resource Management processes.

For each vendor, only those solutions in which the use of Artificial Intelligence was explicitly stated were selected to ensure that these solutions clearly fell within the scope of our research. This selection criterion allowed us to circumscribe the analysis to the solutions relevant to the study, ensuring consistency with the objective of specifically investigating the application of AI in Human Resource Management processes.

Each identified solutions was subsequently ranked according to specific parameters;

- **Macro process**: Indicates the macro process corresponding to the reported solution.

- **Process**: Indicates the process corresponding to the reported solution.

- **AI solution**: Refers to a summary of the solution highlighting the interaction between AI and HR processes.

- **AI Observatory Class**: Indicates the class of AI related to the reported solution.

- **Vendor Name**: Indicates the manufacturer of the reported solution.

- **Solution code**: Indicates the unique code that identifies the solution.

- **Solution description**: Refers to a detailed description of the solution.

- **Link**: Refers to the link to the webpage corresponding to the description of the solution.

The result obtained from this search is a list of 61 AI solutions sold by 44 different vendors worldwide. A vendor can be contained in more than one row if it presents more than one solution.

Once the mapping was completed, the second phase involved creating a taxonomy aimed at identifying, for each process, families of AI technologies that grouped together solutions with similar implementations and addressed the same needs.

Building on the mapping of the 61 identified solutions, a process was undertaken to determine which solutions were similar to each other based on three main criteria: sharing the main function, use of Artificial Intelligence to achieve the same purpose, and a similar technology implementation. These factors made it possible to identify a pool of solutions that were unique with respect to their functionality and class of Artificial Intelligence. Each solution was then ranked according to specific parameters:

- **Macro process**: Indicates the macro process corresponding to the reported solution.

- **Process**: Indicates the process corresponding to the reported solution.

- **AI Solutions Family code**: Indicates the unique code of the identified solution family.

- **AI Solutions Family**: Provides a brief description of the solution family.

- **AI Observatory Class**: Indicates the AI class related to the reported solution family.

- **Solution codes**: Lists the Solution Codes that make up the solution family.

- **Case study codes**: Lists the case study Codes belonging to this solution family. This code is unique for each case study included in the mapping of the Case Studies.

The result of this mapping is the classification of solutions into 23 distinct categories: nine related to *Attraction*, ten to *Learning & Development*, and three to *Well-Being*. In the following paragraph, all the AI solution families identified for each process, along with the corresponding AI class, will be explained in detail.

3.5.2. AI Solutions Families description

This sub-section provides descriptions of the identified AI Solution Families.

Macro process Attraction

Regarding ***Employer Branding***, two AI Solution Families have been identified.

The first, named *Generative AI-based tool for social communication* and associated with the Observatory Class *Generative AI*, includes all the solutions that deal with the automatic generation of social content to improve communication and brand image on social channels. Such solutions help create content that promotes the company as an ideal employer, attracting talent through engaging and strategic communication.

The second, *AI solution family, Tailored recommendations for job candidates*' interests associated with the AI Observatory Class *Recommendation System*, combines solutions that use AI-based recommendation systems to suggest customized company social content to potential candidates based on their interests. These solutions analyze the profiles and preferences of potential candidates and, based on this data, generate targeted content that is delivered through the company's social channels or other digital branding platforms. The goal is to improve the perception of the company as an attractive employer by show-

casing content that resonates with candidates' aspirations and interests, creating a more engaging and personalized communication experience to strengthen brand attractiveness.

On the **Recruitment** side, three AI Solution Families have been identified.

The first, *Candidate recommendations based on job offer matching* associated with the AI Observatory Class *Recommendation System*, includes solutions used to identify and suggest to recruiters the most suitable candidates for specific open positions. These solutions automatically assess the degree to which candidates' skills and qualifications match the company's requirements for each position, providing a matching %age that quantitatively expresses how well the candidate's profile aligns with the requirements. Some systems also present a ranking of candidates sorted by compatibility, allowing recruiters to quickly view the most aligned profiles in order to make selection more efficient and reduce the time it takes to identify top talent.

The second AI solution family, *Job Description Generation*, identified by the AI Observatory Class as *Generative AI*, includes all solutions that support the automatic creation of engaging and accurate job descriptions. These solutions generate position descriptions based on specific role requirements and required skills, using advanced Artificial Intelligence models to analyze and interpret business needs. In this way, job descriptions are accurate and in line with the company's expectations and are able to capture the attention of ideal candidates, making the role more attractive and engaging.

The third, *Automatic filling of candidate profile using the existing CV*, AI Observatory Class *Text Analysis*, brings together solutions used to simplify and automate candidate profile creation. These solutions automatically extract relevant information, such as technical skills, work experience, education level and certifications, from the candidate's CV, organizing this data into a structured profile. Based on the extracted data, the system can also categorize skills according to their relevance to the position sought, highlighting core competencies and creating a comprehensive profile consistent with business needs.

As for **Selection**, four AI Solution Families were identified.

The first, *Data analysis using gamification-based selection algorithms*, AI Observatory Class *Data Exploration*, brings together solutions that use Artificial Intelligence to analyze candidate performance through gamification activities. These solutions engage candidates in games, simulations or interactive tests designed to assess specific skills, such as problem solving, critical thinking, communication skills and resilience. Artificial Intelligence collects and interprets data generated during these activities in real time, analyzing behaviors, responses and strategies adopted by candidates and identifying patterns of skills

that might not emerge in a traditional interview. In addition, AI can generate a score or ranking of candidates based on their performance, or identify areas of strength and improvement, thus enabling objective and predictive comparison of candidates.

The second AI solution family, called *Chatbots based on generative AI for candidate profiling*, AI Observatory Class *Data Exploration*, identified by the AI Observatory Class as *Generative AI* collects solutions based on advanced chatbots that handle the initial phase of candidate selection and profiling. These chatbots interact in a dynamic and personalized manner, simulating natural conversation and gathering key information about skills, experience, and professional goals. Using generative intelligence, chatbots can adapt questions in real time based on the answers provided by candidates, delving into specific aspects of their background. These chatbots also use Natural Language Processing algorithms to analyze and interpret the candidate's language, identifying skills, personality traits, and affinities with the company culture. The data collected is organized into a structured profile, which is useful for quick assessment by recruiters.

The third AI solution family for the *Selection* process, *Automatic candidate profiling from video interviews*, AI Observatory Class *Image & Video Analysis*, includes all solutions that use advanced technologies of for automatic candidate profiling during video interviews. This family of solutions analyzes various nonverbal aspects, such as facial expressions, posture, body language and tone of voice, to extract information about interpersonal skills, emotional stability and responsiveness. Artificial Intelligence interprets these signals to identify characteristics such as stress management, adaptability, and motivation. In addition, these solutions automatically evaluate candidates based on predetermined criteria, offering a quantitative assessment that helps recruiters understand deeper aspects of candidates' personalities and soft skills.

The latest AI solution family, *Automated post-interview feedback generation*, associated with the Observatory Class *Generative AI*, combines all solutions that facilitate the automatic creation of immediate and personalized post-interview feedback. This solution gathers key information directly from the interview, analyzing both the candidate's verbal responses and, when integrated with video and audio analysis technologies, nonverbal elements such as tone of voice, speech rhythm and facial expressions. During the interview, AI records and analyzes the content of responses, identifying specific skills, experiences and abilities. Using Natural Language Processing, the AI interprets natural language and categorizes responses based on predetermined parameters such as technical skills, communication skills, and problem solving. When combined with *Image & Video Analysis*, the system can also interpret signals of confidence, adaptability or stress level. This data is then processed by GenAI, which synthesizes all the information gathered into a structured

feedback report consistent with the company's tone, offering recruiters a comprehensive and timely assessment of candidates.

Macro process Learning & Development

Regarding **Career Growth**, three AI Solution Families have been identified.

The first, called *Suggestions on reskilling based on future career vision* and associated with the AI Observatory Class *Recommendation System*, brings together all solutions that support employees in receiving personalized suggestions on skills to develop in line with their future career goals. These systems analyze the employee's profile, current skills and career aspirations, and then generate a training path aimed at filling any skills gaps and facilitating professional growth within the company. The goal is to offer customized reskilling paths that increase employees' competitiveness and job satisfaction.

The second, *Suggestion for relocation of employees based on skills*, also associated with the AI Observatory Class *Recommendation System*, includes solutions that suggest potential relocations of employees within the company based on the skills they possess. These solutions examine employees' skills, experience and potential in relation to available positions or business needs, identifying outplacement opportunities that best enhance talent and promote effective internal mobility.

The third, called *Analysis of missing skills for maintaining competitiveness* and identified by the AI Observatory Class *Data Exploration*, includes all solutions that analyze missing skills in the workforce to maintain business competitiveness. Through mapping of existing skills and predictive analysis of emerging skills in the market, these solutions identify skill gaps at the individual and organizational level. The results of the analysis are used to plan targeted development programs, ensuring that employees acquire relevant and up-to-date skills to keep the company competitive in the long run.

Regarding **Feedback Management**, three AI Solution Families have been identified.

The first, *Creation of feedback-based summary reports*, associated with AI Observatory Class *Data Exploration*, brings together all solutions that automatically generate summary reports based on feedback received. These solutions analyze feedback data from evaluations, surveys and other sources, synthesizing them into structured reports that provide a comprehensive view of employee performance and engagement. The reports help managers identify areas of strength and improvement at the individual and team level, enabling targeted actions to be taken to improve performance.

The second, *Analysis for improving the quality of internal communication*, associated with AI Observatory Class *Text Analysis*, includes solutions that analyze the quality

and effectiveness of internal corporate communication. These solutions use text analysis algorithms to examine email content, corporate communications and feedback, identifying potential areas for improvement in terms of message clarity, engagement and consistency. The goal is to optimize internal communication, ensuring that it is aligned with corporate culture and supports a collaborative work environment.

The third, *Automatic feedback generation*, identified by the AI Observatory Class as *Generative AI*, includes all solutions that automate the creation of feedback for employees. Using advanced generative intelligence models, these solutions generate personalized feedback based on performance data and evaluations collected over time. Automated feedback gives employees a clear and detailed understanding of their performance, highlighting successes and areas for improvement in a timely and continuous manner.

Regarding **Training**, four AI Solution Families have been identified. The first, *Recommendations courses tailored to the employee's interests*, associated with the AI Observatory Class *Recommendation System*, combines solutions that suggest training courses tailored to employees' interests. These systems analyze each employee's profile, growth goals and required skills, and then recommend specific courses that meet their needs. The goal is to enrich the employee's knowledge by offering content that reflects their aspirations and supports their professional development.

The second, *Chatbots that answers employees' questions in an automated way*, associated with the *Generative AI* Observatory Class, brings together solutions that use intelligent chatbots to automatically answer employees' questions. These chatbots, integrated with management systems and company documentation, can provide quick and accurate answers on a variety of topics such as company policies, how to perform tasks, administrative concerns and more general support requests. The availability of ongoing support helps employees resolve doubts quickly and obtain required information without having to consult manuals or be assisted by colleagues.

The third AI solution family, *Performance analysis through gamification-based training processes*, identified by the AI Observatory Class as *Data Exploration*, includes solutions that analyze employee performance through gamified training activities. These solutions monitor and interpret data generated by employees as they participate in games, quizzes or simulations designed to develop specific skills. The AI analyzes participants' responses and behaviors, providing managers with a detailed overview of the skill areas developed and the skills to be improved.

The latest AI solution family, *Automatic generation of tests, quizzes and training content*, associated with the Observatory Class *Generative AI*, brings together solutions that auto-

matically generate training content, such as tests, quizzes and training modules, tailored to business needs and employee skills. These systems use advanced generative models to create targeted content that helps employees acquire new skills in an interactive and engaging way. Automatic generation of training content reduces the time it takes to develop training materials, improving the effectiveness and customization of training programs.

Macro process Well-Being

Regarding **Employee Well-Being**, three AI Solution Families have been identified. The first, called *Data analysis for assessment of well-being and prevention of stressful situations* and associated with AI Observatory Class *Data Exploration*, includes all solutions that analyze data related to employee well-being to identify and prevent stressful situations. These solutions monitor variables such as workload, productivity and feedback received, using data analysis algorithms to identify patterns that could indicate situations of discomfort or stress. The goal is to support a healthy work environment and prevent the onset of stress-related issues by providing Human Resources with useful information for early intervention.

The second, *Platform for creating new well-being strategies*, associated with the Observatory Class *Generative AI*, brings together solutions for designing new well-being strategies for employees. These generative platforms use internal and industry data to create customized wellness programs, such as mindfulness activities, flexible work plans or other initiatives focused on mental and physical health. Using these solutions, companies can develop innovative and tailored strategies, improving overall wellness and employee engagement.

The third, *Customized recommendations of events and business services to improve engagement*, rapped at the AI Observatory Class *Recommendation System*, includes all solutions that provide customized suggestions of events and business services to increase employee engagement. These recommendation systems analyze employee profiles and preferences, suggesting specific activities, social events or services, such as corporate wellness programs, team building sessions or social initiatives. The goal is to improve satisfaction and participation levels, helping to create a positive and inclusive work environment.

3.5.3. Startup mapping

With the global state of technology offerings outlined through the previously described taxonomy of solutions, the core of the study was approached to address the First Research Question (RQ1). The objective was to identify emerging innovative trends through a systematic mapping of the technology solutions proposed by startups globally, with a

subsequent focus on data related to the Italian market.

To identify startups that met the requirements of our research, two different databases were used for data extraction. The first database consulted was Crunchbase, an international repository of startups. Crunchbase uses a tag-based search system, allowing us to find startups relevant to our research criteria. The data extraction was conducted on August 9, 2024, selecting startups that met the following requirements:

1. Founded after January 1, 2019, to include only startups with less than five years of activity.

2. With a "last funding date" after January 1, 2022, to ensure the startups are still active and in a phase of innovative growth.

3. Including at least one of the following tags in their description: Human Resources, Employment, Recruiting, Social Recruiting, Corporate Training, Wellness, Career Planning.

4. Including at least one of these tags in their description: Artificial Intelligence, Generative AI, Intelligent Systems, Machine Learning, Natural Language Processing, Predictive Analytics.

The extraction yielded 327 startups, for which a manual review of their websites was conducted to assess their relevance to the defined research criteria. Startups deemed irrelevant to the study were eliminated, as they were erroneously selected due to tags that could also apply to other sectors or contexts. Following this review, 195 startups were identified as relevant to the study.

Subsequently, the research was expanded using the Alba database, a proprietary resource managed by the Startup & Scaleup Hi-Tech Observatory of the Politecnico di Milano, which records the funding rounds of Italian startups from 2012 to the present. This database collects information on funding from formal and informal investors, both domestic and international. The unit of analysis is funding rounds, which are associated with detailed information on founders, startups, and characteristics of the round itself. The database provided contained 2680 startups, from which those that possessed both "AI" and "HR" tags were filtered out, resulting in a total of 22 startups.

Finally, 195 relevant international startups from Crunchbase and 22 Italian startups from Alba were identified, for a total of 217 startups analyzed in detail. selected. The classification focused on the main solution offered by each startup, highlighting how they often focus on a few technologies, but with a highly innovative and specialized approach.

They were ranked according to some criteria:

1. **General information**:

   - **Commercial name**: Indicates the business name of the startup.

   - **Website**: Indicates the startup's website.

   - **Description**: Provides a detailed description of what the startup is about.

   - **Short description**: Indicates a summary of the description.

   - **Country**: Indicates the country where the startup was founded.

   - **Geographical area**: Indicates the continent where the startup was founded.

   - **Scope**: Indicates the geographic area where the startup operates.

   - **Founding year**: Indicates the year the startup was founded.

2. **Financing**:

   - **Total funding raised (in USD)**: Indicates the total amount of funding raised.

   - **Date of most recent funding round**: Indicates the date of the most recent funding received.

   - **Total most recent funding round raised (in USD)**: Indicates the value of the last funding round received.

   - **Funding round**: Indicates the number of grants received.

   - **Type of funding**: Indicates the type of funding received.

3. **Research objective**:

   - **Macro Process**: Indicates the macro process corresponding to the reported solution.

   - **Process**: Indicates the process corresponding to the reported solution.

   - **AI Observatory Class**: Indicates the AI class related to the reported solution family.

   - **AI Solution Families**: Indicates the unique code of the identified solution family.

   - **Other**: Reports technology if not included in previously identified families.

- **Research scope**: Indicates whether the startup is within the scope of the search.

The attributes "general information" and "financing" were already included in the extracted data, while additional columns concerning macro processes, processes, AI class, and AI solutions family were completed manually following the definitions given above for each of these attributes.

The final result is a database of international startups with a slightly higher representation of Italian startups than the actual global distribution due to the startups selected from the Alba dataset. This choice was made to obtain a more complete database for Italy, which is a focus of our research, and to allow a more meaningful comparison with other international startups.

Following the creation of this database, an analysis was carried out to examine emerging and innovative trends within the AI startup sector as applied to HR processes, with a focus on the period from 2020 to 2023. The analysis was structured as an in-depth examination of startups offering AI-based solutions supporting HR processes, with particular attention to the distribution of companies in the dataset according to various variables of interest. Subsequently, the trend analysis involved mapping startups based on their founding year, to observe sectoral evolution and identify emerging technologies over time.

The analysis began with an overall distribution of the startups, later refined to highlight specific trends regarding the number of companies founded and their financial growth from 2020 to 2023. To ensure a uniform four-year interval, 2019 was excluded, while 2024 was omitted due to incomplete data, making it unsuitable for comprehensive comparative assessment. This approach provided an evolutionary outline of the sector, offering insight into technologies that gained significance over time.

The results of this analysis will be discussed in detail in the following chapters.

3.5.4. KPIs mapping

To analyze the impacts of the adoption of AI solutions in the HR context, reference can be made to the measurement of Key Performance Indicators, which are key tools for assessing effectiveness and changes in business processes. Accordingly, one of the main objectives of this study was to identify the KPIs that companies use to measure the impact of AI in HR processes and to assess the actual level of adoption of these indicators.

The KPI mapping carried out aims to provide a comprehensive overview of the KPIs used in the HR context for each process. This mapping provides the basis for answering the

Second Research Question, aimed at analyzing the performance indicators used by Italian companies in HR and how they have changed following the adoption of AI solutions.

The KPIs identified in the literature review were classified according to the related macro processes and processes. The structure of the mapping follows these criteria:

- **Macro process**: Indicates the macro process corresponding to the reported solution.

- **Process**: Indicates the process corresponding to the reported solution.

- **KPI**: Indicates the identifying name of the KPI.

- **KPI description**: Provides a description of the KPI.

- **KPI formula**: Indicates the formula for calculating the KPI.

The list of identified KPIs was addressed in the interviews conducted with industry experts, which will be discussed in detail in section 3.5.7.

3.5.5. Insights on AI adoption in HR in Italy from the HR Innovation Practice Observatory

To address the second research question, aimed at exploring the impacts and main barriers to the adoption of AI-based solutions in Human Resource Management processes in Italian organizations, a preliminary analysis was conducted. This study, focused on the Italian context, was based on data collected by the HR Innovation Practice Observatory of the Politecnico di Milano and reported in the paper for the biennium 2023-2024, which provides a detailed overview of the adoption of AI technologies in HR practices in Italy. To complement the Observatory's data collection activities, our team actively participated by conducting interviews with HR managers of the companies involved, contributing firsthand to the collection of information.

The analysis shows that the *Text Analysis* class of AI, which includes systems for interpreting written language and conversational systems not based on generative models, is the most widespread, being present in 15 % of Italian organizations, with a further introduction planned for 16 % of companies in the next 12 months. This class also includes natural language processing systems, used mainly for resume analysis, currently adopted by 8 % of companies with an expected growth of 6 % in the next year.

The second class consists of *Image & Video Analysis* systems that can extract meaningful information from images, videos and other visual and auditory inputs, which can generate

alerts or take actions based on the collected data. However, in the HR context, such solutions are still poorly deployed, with a penetration of only 2 %.

The class *Data Exploration* includes tools capable of identifying patterns, trends and meaningful relationships between data, providing accurate predictions and supporting decision making. These systems also enable the creation of hypothetical ("what-if") scenarios to evaluate the possible consequences of various actions, support the selection of optimal solutions for complex problems, and the prediction of future outcomes, such as turnover or market trends. However, the adoption of these technologies is currently limited, although 8 % of organizations plan to introduce them in the next 12 months.

The fourth category concerns *Recommendation System*, which are designed to guide users' preferences, interests and, more generally, decisions, based on information provided directly or indirectly. These systems generate personalized recommendations applicable at various points in the employee experience. Currently, 8 % of organizations use algorithms of this type to support HR processes, with a 5 % growth forecast for next year.

Finally, the category of *Generative AI* includes GenAI systems, which use machine learning algorithms to autonomously generate new content from input, such as text, audio, images, video, and computer code. The distinguishing feature of this technology is its ability to generate original content not found in training data. 43 % of Italian organizations are experimenting with the use of GenAI in HR, particularly in personnel selection, training and development processes (Osservatorio HR Innovation Practices, 2024b).

3.5.6. Case studies mapping

In light of the results that emerged from the research conducted by the HR Innovation Practice Observatory of the Politecnico di Milano, an exploratory analysis was undertaken to identify, through a thorough search of case studies, a set of companies operating in Italy that use Artificial Intelligence in their Human Resource Management processes. The primary objective of this mapping was to survey as many of the solutions adopted by these companies as possible in order to analyze their technology portfolio in detail through targeted interviews, with the intent of answering the second research question (RQ2).

The research was divided into several steps. The first step involved a thorough review of the websites of the technology solution providers previously identified in the solution mapping. For each provider, the website was consulted, the section on "business cases" was searched, and only those cases where the name of the company operating in Italy and applying AI in Human Resource Management practices was clearly indicated were

selected and mapped. The second step involved mapping the business cases available on the HR Innovation Practice Observatory's website. Again, only those cases that used AI in a concrete and operational way were selected, excluding those limited to early stages.

Additionally, during the 2023-2024 academic year, collaboration took place with Observatory researchers to conduct interviews with companies participating in the HR Innovation Awards, sponsored by the Milan Polytechnic. In this context, support was provided for data collection and analysis, contributing to the drafting of business cases based on interviews with candidate companies, thus obtaining new data for inclusion in the mapping.

The last phase of the research involved the use of the Google search engine, with the goal of further expanding the collection of case studies. This activity was carried out between 13 April 2024 and 20 May 2024, employing specific keyword strings, selected according to the macro processes and processes of interest. These keywords, formulated in Italian to facilitate the identification of case studies relevant to the Italian context, were chosen to ensure the most comprehensive coverage possible of AI solutions applied to various HR domains. The search focused exclusively on the websites of solution providers, excluding articles or sources derived from trade journals, and limiting the analysis to results reported in the first two pages of Google.

Below, the keywords used for each process are illustrated:

1. **Attraction**

   - For the process ***Employer Branding***, the keywords used were "Human Resources, Artificial Intelligence, Employer Branding" and "HR, AI, Employer Branding."

   - For the process ***Recruitment***, the keywords used were "Human Resources, Artificial Intelligence, Recruitment" and "HR, AI, Recruitment."

   - For the process ***Selection***, the keywords used were "Human Resources, Artificial Intelligence, Selection" and "HR, AI, Selection."

2. **Learning & Development**

   - For the process ***Career Growth***, the keywords used were "Human Resources, Artificial Intelligence, Career Growth" and "HR, AI, Career Growth."

   - For the process ***Feedback Management***, the keywords used were "Human Resources, Artificial Intelligence, Feedback."

   - For the process ***Training***, the keywords used were "Human Resources, Artifi-

cial Intelligence, Training" and "HR, AI, Training."

3. **Well-Being**

   - For the process ***Employee Well-Being***, the keywords used were "Human Resources, Artificial Intelligence, Employee well-being, well-being, Engagement" and "HR, AI, Employee well-being."

The case studies found were then mapped following the criteria:

- **Macro Process**: Indicates the macro process corresponding to the reported solution.

- **Process**: Indicates the process corresponding to the reported solution.

- **Company name**: Indicates the name of the company involved in the Case Study.

- **Company sector**: Indicates the industry in which the company operates.

- **Vendor name**: Indicates the manufacturer of the reported solution.

- **Case study code**: Indicates the unique code that identifies the Case Study.

- **AI Observatory Class**: Indicates the AI class related to the reported solution.

- **Technologies Family codes**: Indicates the unique code for the identified solution family.

- **AI Solutions Family**: Contains a summary of the solution that highlights the interaction between AI and HR processes.

- **Case study description**: Contains a detailed description of the solution referred to in the case study.

- **Link**: Contains a link to the webpage corresponding to the case study.

The research identified a total of 46 case studies on the application of AI technologies in the HR sector, distributed among 36 Italian companies operating in 13 different sectors. These case studies formed the starting point for selecting companies to be interviewed, with the aim of delving into the topic of measuring the impacts.

3.5.7.   Interviews

After analyzing a significant number of case studies and mapping them according to the previously described criteria, the companies considered most advanced in the application of Artificial Intelligence solutions to their HR management processes were selected.

The goal of the interviews was to delve deeper into the case studies analyzed and identify additional solutions adopted by Italian companies, with the aim of obtaining a more accurate mapping of the demand side, represented by AI solutions implemented in HR processes. It also aimed to investigate the KPIs used by companies to measure the impact of these solutions and to understand how these indicators have changed following the introduction of Artificial Intelligence.

The selection of companies to be interviewed was made following three priority criteria.

The first criteria was to ensure a heterogeneous sample in terms of industry, based on the assumption that companies operating in different industries have different needs, adopt specific HR practices, and use diverse AI technologies. This approach increased the likelihood of detecting a variety of AI technologies applied to different HR processes.

The second criteria aimed to ensure the most comprehensive coverage of HR processes possible, based on the analysis of business cases. This criterion was chosen as the second because business cases tend to focus on a single solution, among the many that can be implemented by a company. Consequently, the solution described could not be considered an exclusive parameter for selection.

Finally, once the pool of companies of interest was identified, priority was given to those with contacts from the Observatory or accessed through LinkedIn.

The goal of the selection was not to achieve complete theoretical saturation which would require a sample large enough to cover all possible theoretical variables. Instead, the aim was to obtain a meaningful understanding of how Italian companies adopt AI solutions in their Human Resource Management processes (Guest et al., 2006). This article showed that most themes emerge in the first six to 12 interviews, while the emergence of new themes becomes increasingly rare beyond that number .

Furthermore, a study showed that, in specific research surveys, extremely accurate information can be obtained by interviewing as few as four highly competent individuals (Romney et al., 1986).

Considering that the interviewees in this study are HR directors and managers, professionals with extensive experience and expertise in both HR management and AI technology implementation, a larger sample size of four interviews was deemed appropriate. Their experience provides a solid basis for understanding current practices and challenges related to the use of AI in HR processes, thus meeting the exploratory objectives of this study.

The application of these criteria resulted in the selection of a sample of 7 companies,

representative of a variety of HR industries and processes. Each company was sent a request to participate in an interview lasting approximately one hour, aimed at exploring the topics of interest in the research. A total of 7 companies accepted and participated in the interviews.

In addition, the choice of companies to be interviewed for this research focused on large companies with high turnovers, such as Cimbali Group, Medtronic, Sace, Vodafone, Company 1, Company 2 and Company 3, based on two main reasons. First, these companies, due to their size and economic resources, tend to be at the forefront of advanced technology adoption and generally have significant budgets to invest in technological innovation.

As argued in the existing literature, large organizations, particularly those operating at the multinational level or occupying a central position in global value chains, have greater influence in the diffusion of best practices. Such companies are often considered leaders in promoting innovative and sustainable approaches, including in Human Resources(Aust Before Ehnert et al., 2013).

According to the financial reports published on the companies' websites, all of them recorded revenues in excess of $1 billion in 2023, confirming their economic significance. Company 1 ended 2023 with revenues of about $14.7 billion, Vodafone Italia exceeded $5 billion, and Medtronic, globally, reached more than $31 billion. Company 2 and Sace also recorded revenues of $4.5 billion and over $1 billion, respectively, while Gruppo Cimbali reported a production value of $251.8 million as of December 31, 2023, reflecting a 7.35% increase compared to the previous year.

This homogeneity in terms of size and economic capacity allows for more accurate comparability among the surveyed organizations, especially with regard to the adoption of AI solutions and their application in HR processes.

This homogeneity in terms of size and economic capacity allows for more accurate comparability among the surveyed organizations, especially with regard to the adoption of AI solutions and their application in HR processes.

As noted in the literature, a homogeneous sample of companies facilitates achieving theoretical saturation, as the selected companies share characteristics that make them particularly suited for comparison regarding the implementation of advanced technology solutions (Guest et al., 2006).

4 | Findings

This chapter will present the findings from the startup mapping, including all relevant data collected, as well as insights from the interviews conducted. The section on mapping will provide a detailed overview of innovative trends in the global market for AI-based solutions applied to HR processes, with a focused analysis of the Italian context. In the subsequent part, the results of the interviews will be presented, with each paragraph dedicated to a specific company. Each section will analyze the solutions used by each company and how they integrate into various HR management processes, highlighting the impacts and benefits these AI solutions are bringing to real-world business settings.

4.1. Overview of startup mapping results

This section presents the results of the startup mapping, with methodology detailed in paragraph 3.5.3.

The dataset consists of 217 startups, 195 sourced from Crunchbase and 22 from the Alba dataset, provided by the Startup Observatory of the Politecnico di Milano, which includes exclusively Italian startups. The inclusion of the Alba dataset introduces a slight geographic imbalance, increasing the representation of Italian startups relative to the international presence, as it focuses primarily on local initiatives. This choice reflects the need to delve deeper into the Italian market and to compare it with the global landscape, one of the primary objectives of this research.

The analysis of the global context aims to address RQ1, which explores innovative trends in the international market for AI-based solutions applied to HR processes. The focus on the Italian market serves as an introductory phase, laying the groundwork for RQ2, which examines the specific impacts of such AI solutions on Human Resource Management within Italian organizations.

In the following sections, the composition of the dataset is outlined, and the data distribution is discussed based on geographic, financial, and quantitative criteria deemed relevant to this study. Particular attention is dedicated to the Italian market, with an in-depth

analysis of emerging trends and distinctive characteristics of the sector.

4.1.1. Innovative AI Solutions Families

As described in detail in Chapter 3, on methodology, the first step was to select startups that integrated Artificial Intelligence solutions applied to the Human Resources domain and met the criteria established by macro process and process. Once these areas were identified, further categorization was performed to assign each startup to a specific class of Artificial Intelligence and corresponding AI solution family. The latter categorization is based on a set of 22 predefined solution families described in Chapter 3.

However, during the analysis, 10 startups emerged that used solutions that did not fit into the 22 families of AI solutions originally identified. As a result, it was necessary to expand the classification by creating new combinations of AI class and AI solution description to adequately describe the type of solution developed by these startups. The new "AI solution families" are as follows.

1. **Interview Facilitation via AI-Generated Recruiter**: Within the *Attraction* macro process, particularly in the *Selection* process, this AI solution autonomously conducts candidate interviews through *Generative AI* technology. It is programmed to simulate the role of a human recruiter by posing structured questions, analyzing candidate responses, and evaluating qualifications based on predetermined criteria.

2. **AI-Generated Assessments Using Realistic Scenario Simulations**: Situated within the *Attraction* macro process and the *Selection* process, this AI solution employs *Generative AI* to design interactive, scenario-based assessments. By generating realistic work environments or task simulations, candidates are provided with an opportunity to exhibit problem-solving abilities, adaptability, and critical thinking within a controlled framework.

3. **Real-Time Support for Recruiters During Interviews**: Aligned with the *Attraction* macro process in the *Selection* process, this *Generative AI* solution offers real-time assistance to human recruiters during candidate interviews. The technology provides immediate suggestions, question prompts, and insights in response to candidates' answers, thereby ensuring comprehensive interview coverage and dynamic adaptability.

4. **AI-Driven Support for Enhanced Meeting Efficiency**: Under the *Learning & Development* macro process in the *Feedback Management* process, this solution employs *Generative AI* to enhance meeting efficiency. It offers real-time summaries,

highlights essential discussion points, and delivers actionable feedback to partici-
pants, promoting a streamlined and productive meeting environment.

5. **Emotional Support for Employees Through Video Analysis**: Positioned within the *Well-Being* macro process, specifically in the *Employee Well-Being* process, this AI solution utilizes *Image & Video Analysis* technology to provide emotional support for employees. By analyzing facial expressions, body language, and other visual cues, the system assesses employees' emotional states during live or recorded video interactions.

4.1.2.   Geographical and functional distribution

Geographical distribution

The geographic distribution of startups in the benchmark dataset shows a clear predominance of North America, home to 42.86 % of the 217 startups analyzed. This is followed by Europe, which accounts for 33.18 % of the total sample, while Asia makes up 16.13 %. Other areas of the world show a significantly reduced presence, with South America at 5.07 %, Oceania at 2.30 % and Africa at 0.46 %. This distribution reflects a concentration of HR Tech initiatives in the main hubs of technological innovation, with North America and Europe dominating. Italy, with 22 startups, contributes significantly to the European landscape, suggesting a growing interest in AI technologies applied to HR processes within the Italian market.

Functional distribution by Macro Process and Process

The distribution by processes shows an overall concentration of startups on the macro process of *Attraction*, which accounts for 55.30 % of initiatives, followed by *Learning & Development* with 27.65 %. Within *Attraction*, the main specific processes include *Recruitment*, which accounts for 38.71 %, *Selection* at 14.75 % and *Employer Branding* at 1.84 %. As for *Learning & Development*, 10.14% of startups focus on *Career Growth*, 6.91% on *Feedback Management* and 10.6% on *Training*. Finally, the Well-Being macro process accounts for 17.05% of startups.

As for the Italian context, the distribution of startups presents distinct characteristics compared to the global landscape. The *Learning & Development* macro process is preponderant, involving 45.45 % of the initiatives, a percentage significantly higher than the international average of 27.65 %. The *Attraction* macro process accounts for 40.91 %, while Well-Being is less represented, at 13.64 %, compared to the global 17.05 %.

Analyzing the specific processes, it appears that *Career Growth* and *Training* are particu-

larly relevant in Italy, with 18.14% and 22.73% respectively, indicating a focus on internal skills development. In contrast, processes related to Well-Being are less developed than in the international context.

Distribution by AI Classes and AI Solution Families

Regarding the distribution across the five AI classes identified by the Observatory, the international %ages are as follows: *Recommendation System* represent 41.47%, *Generative AI* 33.64%, *Data Exploration* 17.51%, *Text Analysis* 4.61%, and *Image & Video Analysis* 2.76%. This breakdown highlights a prevalence of solutions focused on recommendation systems and GenAI.

As for the data on AI solution families, which represent specific applications developed by startups, the five most relevant families globally are: *Candidate Recommendations Based on Job Offer Matching*, which constitutes 32.72% of the solutions, followed by *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* at 9.22%, indicating a growing trend toward organizational well-being. In third place, can be found *Chatbots Based on Generative AI for Candidate Profiling* at 7.83%, followed by *Platforms for Creating New Wellbeing Strategies* at 5.53%, and finally, *Automatic Generation of Tests, Quizzes, and Training Content* at 5.07%.

In Italy, the distribution across the five AI classes shows a predominance of *Generative AI* at 40.91%, followed by *Recommendation System* at 31.82%, *Data Exploration* at 18.18%, and *Text Analysis* at 9.09%, with no significant presence of *Image & Video Analysis*. Regarding Italian AI solution families, the most represented solutions are *Chatbots that Answer Employees' Questions in an Automated Way* at 22.73%, followed by *Candidate Recommendations Based on Job Offer Matching* and *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations*, both at 13.64%, confirming the growing interest in *Employee Well-Being*. Other relevant families include *D Generation and Suggestions for Reskilling and Relocation Based on Future Career Vision*, each with 9.09%.

4.1.3. Financial analysis

Conducting a comprehensive financial analysis was deemed essential to gain a detailed understanding of investment priorities and emerging trends in the field of Artificial Intelligence solutions applied to Human Resource Management. The approach adopted includes an initial presentation of the total cumulative investments collected in the sector, followed by an analysis of the latest funding round, which serves as a significant metric of investor interest and current confidence in each technological area.

In addition to the total sum of investments, the analysis also considers the average funding per macro process and individual process to mitigate the influence of outliers and provide a more balanced view of the actual distribution of financial resources. This methodological approach allows for a more accurate and representative overview of capital allocation among startups, offering a comprehensive insight into the investment dynamics that characterize the sector.

Total funding distribution by macro process and Process

The financial analysis shows a heterogeneous distribution of the total funding so far accumulated by startups, broken down among the main macro processes and specific processes associated with integrating Artificial Intelligence into Human Resources. Among the macro processes, *Attraction* emerges as the most funded, totaling $202 million, followed by *Learning & Development* with $58 million and *Well-Being* with $37 million. This distribution suggests a strategic preference for the *Attraction* macro process in the allocation of overall resources. The average funding for each macro process confirms these priorities: *Attraction* averages $2.3 million per startup, *L&D* $1.4 million, and *Well-Being* $1.3 million. These average values reduce the impact of extreme investments, providing a more balanced perspective of typical funding priorities for each macro process.

In the analysis of specific processes, Recruiting emerges as the area with the highest funding, with a total of $150 million, followed by *Selection* with $50 million and *Career Growth* with $40 million. Other processes, such as *Employee Well-Being*, *Feedback Management* and *Training*, receive 40 *million*, 10 million and $10 million, respectively, while *Employer Branding* gets $3 million. Funding averages by process consolidate these priorities: *Selection* presents an average of $2.7 million per startup, Recruiting $2.3 million, *Career Growth* $2.1 million and *Employee Well-Being* $1.3 million, followed by *Training* with $0.7 million. These figures highlight the importance placed on *Selection* and Recruiting processes and a growing focus on *Employee Well-Being* and *Feedback Management*, albeit with lower levels of investment than other core processes.

In Italy, the distribution of funding reflects similar priorities globally, albeit with generally lower amounts. The *Attraction* macro process remains the most funded, with $17.7 million, followed by *L&D* with $5.6 million and *Well-Being* with $5 million. The average funding per macro process in Italy stands at $2.5 million for *Attraction*, $1.9 million for *L&D* and $0.5 million for *Well-Being*, confirming a trend similar to the global trend. Analyzing individual processes, Recruiting is still the most funded, with $15 million, followed by *Career Growth* with $3 million and *Employee Well-Being* with $6 million. Other processes, such as *Feedback Management* and *Training*, receive $0.2 million and $2 million,

respectively, while *Employer Branding* gets $3 million. Funding averages in Italy confirm these priorities: Recruiting receives an average of $2.5 million, while *Career Growth* and *Employee Well-Being* stand at $0.7 million and $1.9 million, respectively, and *Training* averages $0.4 million.

Latest funding round distribution by macro process and process

The analysis of the latest round of global funding shows a diverse distribution of resources among the various macro processes. Even in this context, the *Attraction* macro process is confirmed as the most funded area, with a total of $202 million, followed by *Learning & Development* with $51 million and *Well-Being* with $24 million. The average investment by macro process offers significant insights: *Attraction* receives an average of $2.3 million per startup, *L&D* $1.3 million and *Well-Being* $0.9 million. The use of averages makes it possible to identify typical funding priorities, reducing the impact of exceptionally high investments and returning a balanced overview of investment preferences.

Relative to individual processes, Recruiting is confirmed as the most funded, with a total of $150 million, followed by *Selection* with $50 million and *Career Growth* with $30 million. Other processes, such as *Employee Well-Being*, *Feedback Management* and *Training*, receive $20 million, $10 million and $10 million respectively, while *Employer Branding* gets $3 million. The average investment for each process further confirms the highlighted priorities: *Selection* presents an average of $2.7 million per startup, followed by Recruiting with $2.3 million. *Career Growth* and *Employee Well-Being* stand at $2.1 million and $0.9 million, respectively, while *Training* receives an average of $0.1 million. These figures underscore the importance placed on *Selection* and Recruiting processes, and an increasing focus on *Employee Well-Being* and *Feedback Management*, albeit with lower funding levels than other processes.

In Italy, the distribution of the latest round of funding follows a similar pattern to the global one. *Attraction* remains the most funded macro process, with a total of $17.7 million, followed by *L&D* with $5.6 million and *Well-Being* with $5 million. The average per macro process in Italy stands at $2.5 million for *Attraction*, $1.39 million for *L&D* and $0.5 million for *Well-Being*, mirroring the global trend.

In the analysis of individual processes in Italy, Recruiting emerges as the most funded, with a total of $15 million, followed by *Selection* with $6 million and *Career Growth* with $3 million. *Employee Well-Being* and *Training* receive $6 million and $2 million, respectively, while *Employer Branding* stops at $3 million. The funding averages for each process in Italy confirm the highlighted priorities: Recruiting receives an average of $2.5 million per startup, while *Career Growth* and *Employee Well-Being* stand at $0.7 million

and $1.9 million, respectively, with *Training* at $0.4 million. These figures highlight the attention given to *Selection* and Recruiting processes and a growing interest in *Employee Well-Being* and *Feedback Management*, albeit with lower overall amounts than the macro processes of talent attraction and selection.

Total funding distribution by AI Classes and AI Solution Families

The analysis of the total funding received by startups highlights a heterogeneous distribution of resources across the main AI classes, indicating diverse priorities and interests across different areas of application. *Recommendation System* stands out as the most funded class, with a total of $150 million, followed by *Generative AI* with $73 million and *Data Exploration* with $53 million. *Text Analysis* and *Image & Video Analysis* each receive $11 million. The average investment for each class allows the analysis to be refined: *Recommendation System* records an average of $2.2 million per startup, while *Image & Video Analysis* reaches $2.7 million. The *Generative AI* and *Data Exploration* classes show averages of 1.4 million and 2 million, respectively, and *Text Analysis* stands at 1.2 million. These average values confirm considerable interest in recommendation technologies and generative Artificial Intelligence, followed by more specific applications such as *Data Exploration* and *Text Analysis*.

Relative to AI solution families, which represent the specific applications developed by startups, financial data show a concentration of resources in solutions geared toward candidate-offer matching and organizational wellness. Major solution families include *Candidate Recommendations Based on Job Offer Matching* with $129 million, *Chatbots based on generative AI for candidate profiling* with $27 million, *Analysis of Missing Skills for Maintaining Competitiveness* and *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* , each with $24 million. Other solutions, such as *Automatic filling of candidate profile using the existing CV* and *Automatic candidate profiling from video interviews* , raise $11 million and $8 million, respectively, while JD Generation receives $8 million.

The average investment for each solution offers significant insights. The solutions with the highest average investment include: Real-Time Recruiter Support for the Interview with $4.4 million, JD Generation and *Automatic candidate profiling from video interviews* , *Analysis of Missing Skills for Maintaining Competitiveness* , and AI-Based Support to Increase Efficiency in Meetings, with averages between $3.9 and $3.4 million. Other solutions, such as AI-Generated Tests Based on Real-Life Scenario Simulations, stand at $2.8 million, while *Chatbots based on generative AI for candidate profiling* register averages of $2.7 million.

In Italy, the distribution of the latest funding round reflects similar trends. *Recommendation System* represents the most funded class, with a total of $10.1 million, followed by *Generative AI* with $9.7 million and *Data Exploration* with $8.1 million. *Text Analysis* receives $0.4 million. The funding averages for each class confirm this distribution: *Recommendation System* has an average of $1.44 million per startup, while *Generative AI* and *Data Exploration* show averages of $1.38 million and $2.03 million, respectively. In contrast, the average for *Text Analysis* stands at $0.18 million.

Regarding AI solution families in Italy, resources continue to focus on solutions for candidate-offer matching and organizational wellness. Major families include JD Generation with $7.9 million, *Candidate recommendations based on job offer matching* with $7.1 million and *Generative AI-based tool for social communication* with $2.5 million. *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* receives $5.6 million, while other solutions, such as *Suggestions on reskilling based on future career vision* , get smaller funding of $1.6 million and $1.8 million. The averages of investments per solution confirm these priorities: JD Generation records an average of $3.9 million, *Generative AI-based tool for social communication* $2.5 million, while *Candidate recommendations based on job offer matching* and Data Analysis for Assessment of Well-Being show averages of $1.9 million.

Latest funding round distribution by AI Classes and AI Solution Families

In the latest round of funding received by startups, an analysis of Artificial Intelligence classes shows five main categories, each with differentiated funding levels. *Recommendation System* emerges as the most funded class, with a total of $143 million, followed by *Generative AI* with $68 million and *Data Exploration* with $46 million. *Text Analysis* and *Image & Video Analysis* each raised $11 million. The average investment for each class allows further refinement of the analysis: *Recommendation System* records an average of $2.1 million per startup, while *Image & Video Analysis* stands at $2.7 million. *Generative AI* and *Data Exploration* show averages of $1.4 million and $1.8 million, respectively, and *Text Analysis* presents an average of $1.2 million. These figures confirm the greater interest in recommendation technologies and generative Artificial Intelligence, followed by more specific applications such as *Data Exploration* and *Text Analysis*.

As for AI solution families, which represent the specific applications developed by startups, financial data show a concentration of resources on solutions aimed at candidate-offer matching and organizational wellness. The main solution families include *Candidate Recommendations Based on Job Offer Matching* with $129 million, *Chatbots Based on Generative AI for Candidate Profiling* with $27 million, *Analysis of Missing Skills*

for Maintaining Competitiveness with $21 million, and *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* with $19 million. *Automatic filling of candidate profile using the existing CV* and *Automatic candidate profiling from video interviews* receive $11 million and $8 million, respectively, while JD Generation gets $8 million.

Averages of investments per solution provide significant information. Solutions with the highest averages include Real-Time Recruiter Support for the Interview with $4.4 million, JD Generation, *Automatic candidate profiling from video interviews* , *Analysis of Missing Skills for Maintaining Competitiveness* , and AI-Based Support to Increase Efficiency in Meetings, with average values around $3.4 million. Other solutions, such as AI-Generated Tests Based on Real-Life Scenario Simulations, stand at $2.8 million, while *Chatbots Based on Generative AI for Candidate Profiling* present an average of $2.7 million.

In Italy, the analysis of the latest funding round follows a similar trend. *Recommendation System* emerges as the class with the most funding, reaching $10.1 million, followed by *Generative AI* with $9.7 million and *Data Exploration* with $8.1 million. *Text Analysis* receives $0.4 million. The average investment by class highlights these priorities: *Recommendation System* shows an average of $1.44 million per startup, while *Generative AI* and *Data Exploration* come in at $1.38 million and $2.03 million, respectively. The average for *Text Analysis* results in $0.18 million.

Regarding AI solution families in Italy, resources are oriented toward candidate-offer matching and organizational wellness solutions. The main families include JD Generation with $7.9 million, *Candidate Recommendations Based on Job Offer Matching* with $7.1 million and *Generative AI-based tool for social communication* with $2.5 million. *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* receives $5.6 million, while other solutions, such as *Suggestions on reskilling based on future career vision* , get smaller funding of $1.6 million and $1.8 million. The investment averages for each solution confirm these priorities: JD Generation records an average of $3.9 million, *Generative AI-based tool for social communication* $2.5 million, while *Candidate Recommendations Based on Job Offer Matching* and Data Analysis for Assessment of Well-Being show averages of $1.9 million.

4.1.4. Trends evolution in the 2020-2023 period

To address RQ1 and analyze innovative trends in the international startup market offering Artificial Intelligence solutions for HR processes, both funding trends and emerging solutions were examined in relation to the year of establishment. By using the founding year

as a temporal reference, it was possible to identify prevailing trends and understand how these have evolved over time, with a specific focus on the period from 2020 to 2023. This approach enables a deeper understanding of emerging priorities and interests within the ecosystem of AI-driven HR solutions, highlighting how these needs have transformed over distinct periods. The biennial timeframe was chosen as a temporal reference to provide a more structured and meaningful view of changes, reducing the volatility of annual observations and facilitating the identification of more consolidated trends. By comparing the innovation and funding trends observed in the 2020-2021 biennium to those in 2022-2023, the evolution of market solutions and priorities could be effectively tracked.

The analysis revealed an overall growth trend in the number of startups founded in each macro process (*Attraction*, *Learning and Development*, *Well-Being*) from 2020 to 2023, signaling a growing interest in these specific HR areas. Furthermore, studying the percentage distribution of the macro processes within the start-up dataset, in the first two years, it emerges that 59.42% of the start-ups are dedicated to *Attraction*, 27.54% to *Learning & Development* and 13.04% to *Well-Being*. In the second two-year period, these proportions change: *Attraction* drops to 53.78%, *Learning & Development* stands at 25.21%, while *Well-Being* grows to 21.01% (Figure 4.1).
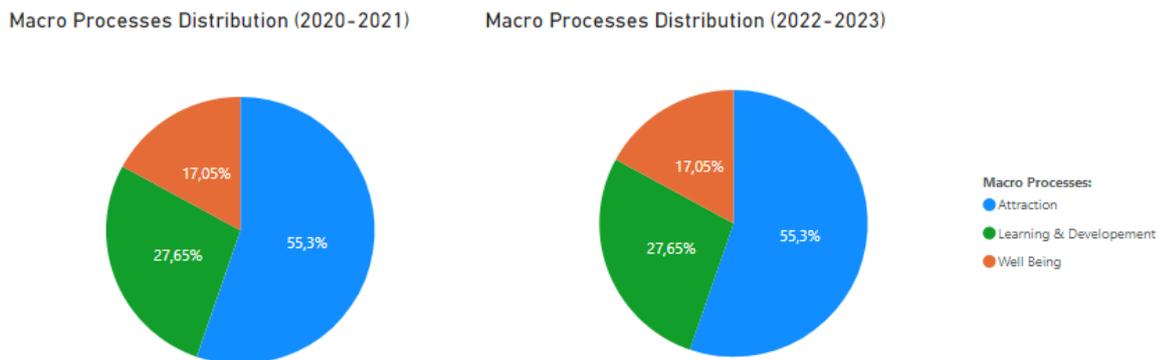

Figure 4.1: Macro process distribution in 2020-2021 and 2022-2023

Analyzing the percentage distribution of the processes within the dataset, it is noted that in the first two years, Recruiting represents 39.13% of the start-ups, Employee Well-being 13.04% and Selection 15.94%. In the second two-year period, the distribution changes: Recruiting rises to 38.66%, Employee Well-being shows a significant increase to 21.01%, while Selection drops slightly to 14.29% (Figure 4.2). Other processes show important changes: Feedback Management increases in terms of representation from 5.8% in the first two-year period to 9.24% in the second. On the contrary, Career Growth decreases from

10.14% to 8.4%, Training drops from 11.59% to 7.56%, and Employer Branding decreases from 4.35% to zero in the second two-year period.
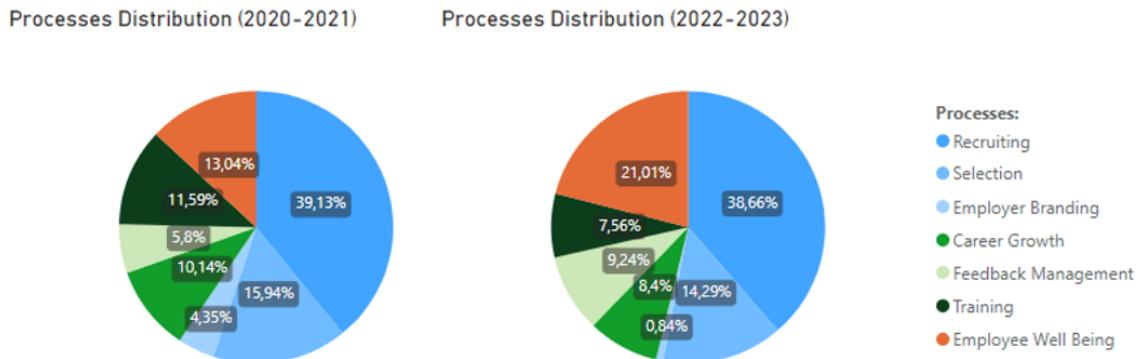

Figure 4.2: Process distribution in 2020-2021 and 2022-2023

The analysis regarding the AI Observatory Classes shows an upward trend in the number of start-ups from the first to the second two years in all five AI classes considered. Analysing the percentage distribution over the years and sorting the classes by size in the second two-year period, Recommendation Systems continues to hold the largest share, although it decreases from 47.83% to 37.82%. Generative AI follows in second place, rising from 30.43% to 34.45% and showing an increase in relevance. Data Exploration comes next, with a slight decrease from 20.29% to 18.49%. Other significant changes can be observed in Text Analysis, which increased significantly from 1.45% to 6.72%, and Image and Video Analysis, which rose from 0% to 1.45% in the second two-year period (Figure 4.3).
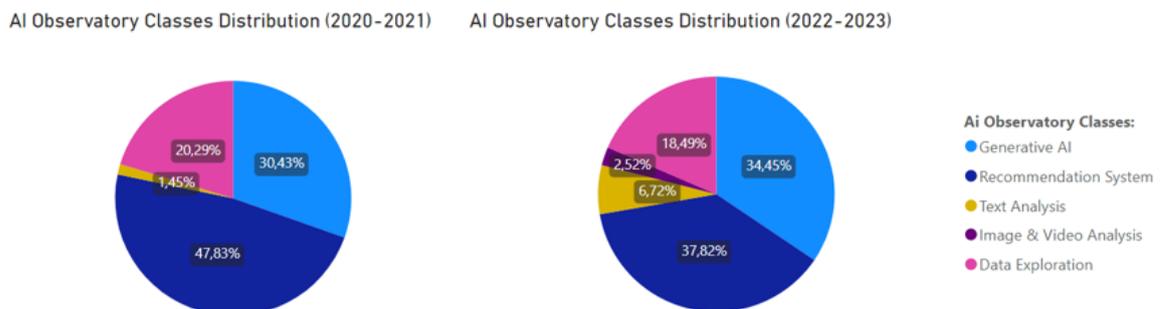

Figure 4.3: AI Observatory Classes distribution in 2020-2021 and 2022-2023

The trend analysis of the AI Solution Families focuses exclusively on those families consid-

ered relevant for the study and which show significant trends, both positive and negative, over time. As shown in the figure 4.4, *Candidate Recommendations Based on Job Offer Matching* dominates the dataset with a share of 60.47%, representing the majority of implemented AI solutions. In second place are Chatbots that Answer Employees' Questions in an Automated Way and Data Analysis for Assessment of Well-being and Prevention of Stressful Conditions, both with 11.63% representation. *Chatbots Based on Generative AI for Candidate Profiling* and Platform for Creating New Wellbeing Strategies show shares of 9.3% and 4.65% respectively. Finally, *Data analysis using gamification-based selection algorithms* shows a very limited presence, with only 2.33%.
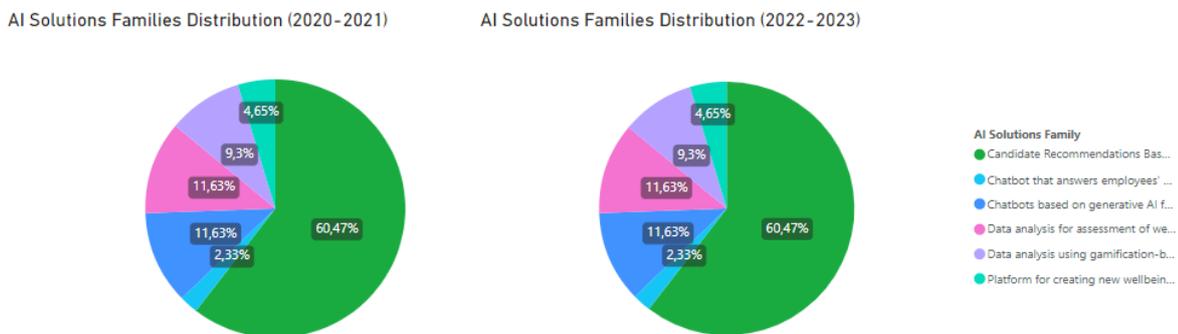

Figure 4.4: AI Solutions Families distribution in 2020-2021 and 2022-2023

In the two-year period 2022-2023, *Candidate Recommendations Based on Job Offer Matching* retains the largest share, although it drops slightly to 48.65%, showing a slight decrease compared to the previous period. In second place comes Data Analysis for Assessment of Well-being and Prevention of Stressful Conditions, which grows to account for 20.27% of the dataset, signalling a growing interest in well-being and prevention solutions. Chatbots that Answer Employees' Questions in an Automated Way occupy third place, accounting for 13.51%. This is followed by *Chatbots Based on Generative AI for Candidate Profiling* , which rose slightly to 10.81%. Platforms for Creating New Wellbeing Strategies and *Data analysis using gamification-based selection algorithms* remain marginal, with 5.41% and 1.35% respectively.

At the financial level, however, a negative trend emerges over the years with regard to macro-processes, individual processes, AI classes and AI Solution Families, a sign of a possible slowdown in the inflow of investments in AI-based HR technologies.

4.2. Findings from the interviews

This chapter presents the findings of the interviews conducted. They were carried out with the objective of determining the extent of demand for AI-based solutions in the field of Human Resources in Italian companies.

As previously outlined in the methodology chapter, the companies were selected to ensure a heterogeneous sample in terms of their respective sectors. Furthermore, the objective was to attain comprehensive coverage of all the processes encompassed within the scope of this research. The objective was met as the number of interviews conducted exceeded the minimum number of five recommended by Romney et al. (1986). A total of seven companies were interviewed, and for each one, a summary sheet is provided below. This outlines the technologies employed and how they are mapped within the framework.

The table below presents an overview of the processes covered and the companies that implement at least one solution in each process.

MACRO PROCESS	PROCESS	COMPANIES
Attraction	Employer Branding	Company 3
Attraction	Recruitment	Cimbali Group, Company 1, Company 2, Vodafone
Attraction	Selection	Company 2, Medtronic
Learning & Development	Career Growth	Sace, Vodafone
Learning & Development	Feedback Management	Cimbali Group, Company 2, Sace
Learning & Development	Training	Cimbali Group, Company 2, Medtronic, Sace, Vodafone
Well-Being	Employee Well-Being	Sace, Vodafone, Company 2

Table 4.1: Overview of Company Processes Emerged from the Interviews

4.2.1. Cimbali Group

Cimbali Group is a renowned Italian manufacturer specializing in professional espresso and cappuccino machines. Founded in 1912, the company has a rich heritage in the design and production of high-quality coffee equipment. Operating under well-known brands such as La Cimbali and Faema, the group serves the global hospitality industry, including cafes, restaurants, and hotels worldwide.

In the realm of *Attraction*, Cimbali Group has enhanced its *Recruitment* process by integrating an AI-supported Applicant Tracking System (ATS) that autonomously suggests

the best candidate profiles. This system reduces the time spent reviewing CVs and promotes objectivity in candidate selection by removing potentially discriminatory data such as gender, ethnicity, and religion. It also helps eliminate cognitive biases of the recruiter. Given the characteristics of this solution, it has been classified under the AI Solutions Family of *Candidate Recommendations Based on Job Offer Matching* and falls into the *Recommendation System* class according to the Artificial Intelligence Observatory.

Regarding the *Learning & Development* macro process, Cimbali Group has implemented AI technologies in both *Feedback Management* and *Training* processes.

In *Feedback Management*, the company utilizes the Nine-box matrix to assess team alignment with the leadership model. This model evaluates both soft skills, such as communication, adaptability, and collaboration, and hard skills, including technical expertise and knowledge. AI helps this process by analyzing data from assessments and self-assessments for each employee. This analysis provides a structured overview of team strengths and weaknesses, identifying present or missing skills, which aids managers in understanding the current state of their coworkers. Furthermore, based on this objective analysis of each employee, incentives are automatically determined, ensuring a fair and data-driven approach to recognizing each team member's value and potential. Currently, the role of AI in performing this task is minimal and closely monitored by HR personnel. In the future, as AI reliability increases and the Cimbali Group continues to invest in innovation, the objective is to progressively reduce human control and implement fully automated process management. Given the nature of this application, it is classified in the AI Solutions Family as *Creation of feedback-based summary reports* and falls under the *Data Exploration* class according to the Artificial Intelligence Observatory.

In the *Training* process, Cimbali Group utilizes a solution, an AI-driven solution designed for automated and objective analysis of language skills, particularly English proficiency. The solution assesses candidates through an interactive chatbot, which presents adaptive questions tailored to the individual's current language level. This approach allows for a precise evaluation of each user's English proficiency, adjusting the complexity of questions based on their responses. Following the assessment, the solution leverages the collected data to generate a personalized training plan aligned with each individual's language development needs. This tailored program provides targeted practice and guidance, helping users to improve their English skills efficiently and effectively. This approach leads to significant resource savings by reducing the need for dedicated personnel to perform language assessments and develop training plans. Additionally, it minimizes potential biases in the training process. For example, without an automated system, managers might unintentionally favor certain employees for advanced training, such as preparing someone

for an international assignment by intensifying their English training, based on subjective opinions of need. This could create disparities if similar opportunities are not extended to other colleagues. By using AI-driven, objective assessments and tailored training plans, the company ensures a fair and consistent approach to language development across all employees, aligning training resources with actual skill levels rather than subjective criteria. Given its characteristics, this solution is classified under the AI Solutions Family of Automatic Generation of Tests, Quizzes, and Training Content and is placed in the *Generative AI* class as for the Artificial Intelligence Observatory classification.

4.2.2. Medtronic

Medtronic is a global leader in medical technology, services, and solutions, operating in over 150 countries. Founded in 1949, the company specializes in developing innovative therapies to alleviate pain, restore health, and extend life for millions of people worldwide. Medtronic's portfolio includes a wide range of products and therapies for cardiovascular, neurological, and chronic disease management, making significant contributions to the healthcare industry.

In the realm of *Attraction*, Medtronic has enhanced its *Selection* process by integrating advanced AI technologies. The company utilizes Paradox, a platform designed to schedule interviews with candidates and streamline the screening process by filtering a large volume of CVs through questions related to the job description. This approach has significantly reduced the time required to fill a position. Given the characteristics of this solution, it has been classified under the AI Solutions Family of *Candidate Recommendations Based on Job Offer Matching* and falls into the *Recommendation System* class according to the Artificial Intelligence Observatory.

Regarding the *Learning & Development* macro process, Medtronic has implemented AI technologies in the *Training* process.

Firstly, the company employs the SAM chatbot, which autonomously manages information requests across the global Medtronic network, handling translations as needed. If the chatbot is unable to provide an answer, it automatically generates a ticket with the corporate service center for further assistance. This system significantly reduces the volume of requests handled manually, freeing up time previously dedicated to this activity. It also shortens the time needed to access requested information, with an estimated savings of around two minutes per query. Given the nature of this application, it is classified in the AI Solutions Family as a Chatbot that Answers Employees' Questions in an Automated Way and falls under the *Generative AI* class according to the Artificial Intelligence

Observatory.

Secondly, Medtronic utilizes Skillab, a training platform focused on soft skills development, allowing employees to deepen specific competencies they wish to enhance. This platform provides recommendations for courses tailored to the employee's interests, facilitating personalized learning experiences. Given its characteristics, this solution is classified under the AI Solutions Family of *Recommendations courses tailored to the employee's interests* and is placed in the *Recommendation System* class as per the AI Observatory classification.

4.2.3. Sace

Sace is Italy's export credit agency, specializing in supporting Italian companies in their internationalization efforts. The company provides insurance and financial services to facilitate exports and investments abroad, offering products such as export credit, investment protection, financial guarantees, and surety bonds. Sace plays a crucial role in promoting Italian enterprises on the global stage, contributing to the nation's economic growth.

In the *Learning & Development* macro process, Sace has integrated several AI-driven solutions across different processes to enhance employee growth and operational efficiency.

In the *Career Growth* process, Sace utilizes Career GPS, an AI-powered tool designed to support the skill-based organizational approach by guiding both employees and the company in making data-driven career and staffing decisions. Career GPS leverages data on employees' current skills, organizational needs, and emerging market demands to create personalized career paths, detailing the time required to acquire necessary skills, suggesting the closest skill profiles, and providing clear guidance on potential career advancements. Drawing on an integrated skill catalog and continually updated personal skill data, Career GPS enables employees to make informed career choices by showing where they currently stand in terms of skills and what they need to develop to reach future roles. On the organizational side, it helps Sace place the right talent in the right roles by allowing managers to search for employees who closely match specific skill sets. This tool even highlights profiles at risk of skill obsolescence, promoting proactive reallocation to high-demand roles where skills are urgently needed. Career GPS operates in real time, continuously updated with skill data, enabling Sace to keep pace with emerging skills in the market. Furthermore, the tool feeds into the skill-based compensation model, where skills—not only job roles—are evaluated to determine base salary within a benchmark range. Sace's unique approach considers the richness of each employee's skill

profile, particularly emphasizing emerging and future-oriented skills, which enhances over-all workforce agility and supports a fair, future-ready compensation system aligned with the organization's evolving skill needs. Through this structured upskilling and reskilling model, Sace has realized 4.5 million euros in savings by closing skill gaps and filling roles internally, ultimately reducing hiring costs, improving productivity, and ensuring a more efficient, competitive workforce. Given the characteristics of this solution, it is classified under the AI Solutions Family of *Analysis of Missing Skills for Maintaining Competitiveness* and falls into the *Data Exploration* class according to the Artificial Intelligence Observatory.

In the *Feedback Management* process, Sace has implemented an AI solution that analyzes meetings to assess their utility and effectiveness. The AI-based support increases efficiency in meetings by highlighting areas for improvement and potential adjustments, such as reducing the number of participants or shortening the meeting duration. The system flags for management which meetings are most essential and which are less critical, identifying those that can be eliminated to reduce time waste. Given these features, this solution is categorized in the AI Solutions Family as AI-Based Support to Increase Efficiency in Meetings and is classified under the *Generative AI* class by the Artificial Intelligence Observatory.

For *Training*, Sace employs a chatbot called SAM which serves as the employees' interface for all informational activities. This chatbot, trained on contracts, regulations, policies, and processes, provides automated responses and information on various employee-related topics, including compensation, benefits, and other HR-related queries. This tool has led to a substantial reduction in process times, decreasing from three hours to just 30 minutes. It has also lowered Human Resource costs by reallocating personnel to higher-value activities and improved the Employee Net Promoter Score, reflecting an enhanced quality of experience. By using this tool, employees save valuable time, enabling them to focus on other priorities. The chatbot is capable of executing transactions within the system using natural language commands, such as booking vacation time directly in the system. Future developments include exploring its evolution as a talent management interface, potentially serving as a front-end tool for talent-related processes. Given its characteristics, this solution is classified under the AI Solutions Family of Chatbot That Answers Employees' Questions in an Automated Way and falls into the *Generative AI* class according to the Artificial Intelligence Observatory.

Additionally, in the *Training* process, Sace is creating well-being Academy, a learning platform that offers a wide range of training courses, designed to help employees deepen their knowledge on topics of personal interest. This leverages AI to provide personalized

course recommendations, tailoring suggestions based on each user's previous training history. This AI-driven approach enables continuous, individualized support for personal growth, as employees receive guidance to explore new areas that align with their evolving interests and development needs. Given the nature of this application, it is classified in the AI Solutions Family as *Recommendations courses tailored to the employee's interests* and is placed under the *Recommendation System* class as per the AI Observatory classification.

In the *Well-Being* macro process, specifically in *Employee Well-Being*, Sace is implementing "Health Navigator," a health-focused application that directs users to the appropriate specialist. The integrated chatbot guides individuals to the right healthcare professional within the platform, tailored to their specific health needs. This solution utilizes data analysis to assess well-being and prevent stressful situations by providing timely and appropriate healthcare guidance. Given the characteristics of this solution, it is classified under the AI Solutions Family of *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* and falls into the *Generative AI* class according to the Artificial Intelligence Observatory.

4.2.4. Vodafone

Vodafone is a multinational telecommunications company headquartered in the United Kingdom, operating in over 25 countries and partnering with networks in more than 40 others. Vodafone Italia, the Italian division of the company, have approximately 5,000 employees, it is the second largest operator by market share in both mobile and fixed telephony, and a turnover of EUR 4.78 billion in 2023.

In the realm of *Attraction*, Vodafone has implemented advanced AI-based solutions to enhance its *Recruitment* process. The company utilizes a recruitment platform integrated with SuccessFactors, enhanced by an additional AI-powered tool that assists in the selection of candidates. This tool allows recruiters, in collaboration with hiring managers, to refine job descriptions beyond standard requirements. By reviewing the technical competencies essential for a role, the system can automatically suggest skills based on job titles, although the final selection is tailored during a consultation between the recruiter and the hiring manager to identify the top must-have skills. The platform also supports defining an ideal candidate profile, which can be based on a sample CV or LinkedIn profile provided by the hiring manager, thereby setting a benchmark for desired attributes in a candidate. Using these customized criteria, the system evaluates each incoming CV, assigning a match score from one to five. This process prioritizes the most suitable can-

didates, improving time-to-hire by allowing recruiters to focus on high-potential profiles while reducing manual screening time. Despite these efficiencies, the platform's reliance on keyword matching necessitates manual verification of high-ranking candidates to ensure that skills listed in CVs genuinely align with those required. Thus, while the system provides a strong initial filter, recruiters remain involved in validating each candidate's suitability. As the accuracy of matches improves, the platform can reduce the volume of CVs needing in-depth review, ultimately streamlining recruitment efforts. Given the characteristics of this solution, it has been classified under the AI Solutions Family of *Candidate Recommendations Based on Job Offer Matching* and falls into the *Recommendation System* class according to the AI Observatory. The vendor providing this solution is SuccessFactor.

Regarding the *Learning & Development* macro process, Vodafone has integrated AI-driven solutions across both *Career Growth* and *Training* processes.

In the *Career Growth* process, Vodafone employs a platform designed to gather a comprehensive overview of employee skills. The platform prompts employees to share their interests, future career aspirations, and preferred work locations. Based on this information, it suggests open positions that align best with their skills, preferences, and the historical career paths of individuals who have previously held those roles. The effectiveness of this solution is measured by the conversion rate, evaluating the actual number of employees who transition into the suggested roles. Given these features, this solution is categorized in the AI Solutions Family as *Suggestion for relocation of employees based on skills* and is classified under the *Recommendation System* class by the Artificial Intelligence Observatory.

Additionally, within *Career Growth*, the platform cross-references current skill data with desired career progression to suggest specific skills that employees should focus on developing. This guidance enables individuals to be prepared to apply for relevant roles in the future, should an opportunity arise. The platform identifies both compatible skills and those requiring development, recommending courses to help employees build these targeted competencies. Future developments include enhancing machine learning algorithms to deliver increasingly relevant and engaging course recommendations tailored to individual development needs and interests. Given its characteristics, this solution is classified under the AI Solutions Family of *Suggestions on reskilling based on future career vision* and is placed in the *Recommendation System* class as per the Artificial Intelligence Observatory classification.

In the *Training* process, after employees upload their CVs, the platform automatically

highlights content relevant to their interests and career paths, offering a personalized se-
lection of resources and learning opportunities aligned with their professional trajectories.
The effectiveness is measured by the number of training hours completed and the number
of users accessing the platform. Future enhancements involve improving machine learning
algorithms to provide increasingly tailored and engaging course recommendations, closely
aligned with individual user interests and development needs. Given the nature of this
application, it is classified in the AI Solutions Family as *Recommendations courses tailored
to the employee's interests* and falls under the *Recommendation System* class according
to the Artificial Intelligence Observatory. The vendor for these solution is Eightfold.

In the *Well-Being* macro process, specifically in *Employee Well-Being*, Vodafone employs
Artificial Intelligence to analyze sentiment in employee surveys. This enables the immedi-
ate identification of key areas of concern and the overall sentiment of the workforce. This
approach offers significant time savings by streamlining the analysis of large datasets,
allowing for quicker insights and responses to employee feedback. Given the character-
istics of this solution, it is classified under the AI Solutions Family of *Data Analysis for
Assessment of Well-Being and Prevention of Stressful Situations* and falls into the *Data
Exploration* class according to the Artificial Intelligence Observatory.

4.2.5.   Company 1

Company 1 is a global high-tech company and one a leading players in Aerospace, De-
fense, and Security in Italy. It operates in over 150 countries, designing and developing
advanced components, products, systems, and services for governments, armed forces,
and institutions.

In the realm of *Attraction*, Company 1 has enhanced its *Recruitment* process by integrat-
ing Artificial Intelligence to match candidates with job requisitions. The unique aspect
of this solution is the use of a system that allows the AI to be trained by providing feed-
back on the level of fit between the job requisition and each candidate. This continuous
feedback loop enhances the accuracy and relevance of candidate-job matching over time.
Given the characteristics of this solution, it has been classified under the AI Solutions
Family of *Candidate Recommendations Based on Job Offer Matching* and falls into the
Recommendation System class according to the AI Observatory.

In the *Well-Being* macro process, specifically in *Employee Well-Being*, Company 1 utilizes
AI to analyze all exit survey results. Over the past year and a half, the company has
implemented an automated process for analyzing exit surveys, focusing on employees who
resign or end their employment for various reasons. This approach provides valuable

insights into the factors driving departures, enabling more strategic decision-making. By facilitating the analysis of large datasets, the AI identifies recurring patterns that can be addressed proactively, allowing for targeted actions to improve retention and address common concerns among departing employees. Given the characteristics of this solution, it is classified under the AI Solutions Family of *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* and falls into the *Data Exploration* class according to the AI Observatory.

4.2.6. Company 2

Company 2 is a prominent Italian multi-utility company operating primarily in the sectors of water, energy, and environmental services. Serving millions of customers nationwide, Company 2 manages integrated water services, electricity distribution, and waste treatment. Mainly active domestically, it also runs operations in Latin America, which will enable it to exceed EUR 4 billion turnover in 2023.

In the realm of *Attraction*, Company 2 has implemented advanced AI-based solutions to enhance its *Recruitment* and *Selection* processes.

In the *Recruitment* process, the company utilizes GenAI technologies for the generation of job descriptions. By employing GenAI, Company 2 generates comprehensive and appealing job descriptions aimed at attracting a diverse pool of candidates. The effectiveness of this solution is measured using KPIs such as the application rate by gender and age group, assessing whether AI-generated job descriptions influence demographic variations in applicant profiles. This initiative has resulted in significant time savings in the *Recruitment* process. Given the characteristics of this solution, it has been classified under the AI Solutions Family of JD Generation and falls into the *Generative AI* class according to the AI Observatory.

In the *Selection* process, Company 2 employs a recommendation system powered by AI to perform intelligent CV screening. This system ranks candidates based on variables set by HR recruiters, identifying those who best fit the open positions. The KPIs used to evaluate this solution include tracking the source of candidates and measuring the selection time from application to hiring, which has led to substantial time savings and improved efficiency in candidate selection. Future developments include refining the timeline measurements by capturing the date of employment letter signing and enhancing the candidate experience through features like one-click CV uploads and automatic field completion. Given these features, the solution is categorized in the AI Solutions Family as *Candidate Recommendations Based on Job Offer Matching* and is classified under the

Recommendation System class by the AI Observatory.

Regarding the *Learning & Development* macro process, Company 2 has integrated AI technologies to advance *Feedback Management* and *Training*.

In the *Feedback Management* process, the company leverages GenAI within the Office suite to streamline document organization, extract key insights, and capture critical information from meetings. This application facilitates significant time savings in tasks involving content generation and organization. Given the nature of this application, it is classified in the AI Solutions Family as AI-based Support to Increase Efficiency in Meetings and falls under the *Generative AI* class according to the AI Observatory.

In the *Training* process, Company 2 employs an AI-driven avatar to administer assessments and independently conduct stress interviews with participants. This tool dynamically processes the interviewee's state to generate questions to assess how the candidate reacts under pressure. Finally, it collects information on employees' decision-making styles and behaviors, with the goal of promoting individual growth through developmental assessments. The avatar analyzes soft skills and identifies skill levels for participants, highlighting areas such as communication skills and decision-making abilities. Based on these profiles, personalized development plans are crafted to target specific improvement areas. Coordinating assessor schedules with participants, especially in large-scale assessments, is challenging; this solution allows participants the flexibility to choose suitable times, leading to positive feedback and significant time savings. Given its characteristics, this solution is classified under the AI Solutions Family of Automatic Generation of Tests, Quizzes, and Training Content and is placed in the *Generative AI* class as per the AI Observatory classification.

4.2.7.   Company 3

Company 3 is a leading Italian media company specializing in television broadcasting, production, and distribution of multimedia content across various platforms. Founded in the 1990s, Company 3 operates several popular television channels and is a significant player in the European media industry. The company is known for its innovation in content delivery and its engagement with diverse audiences through traditional and digital media.

In the realm of *Attraction*, Company 3 has implemented advanced AI-based solutions to enhance its *Employer Branding* efforts. To do so, it has employed the support of StepsConnect as technology provider for the following three solutions.

Firstly, Company 3 utilizes Steps Connect, a GenAI-based tool for social communication, to strengthen and make more engaging its relationship with job seekers, even when they are not actively searching for opportunities. The system analyzes job descriptions, extracts key elements, and constructs highly concise and appealing Instagram posts designed to capture users' attention. These posts push content directly onto potential candidates' feeds, inviting them to click for more information, thereby creating an engaging connection and encouraging exploration of opportunities that might not have been initially considered. Given the characteristics of this solution, it has been classified under the AI Solutions Family of *Generative AI-based tool for social communication* and falls into the *Generative AI* class according to the AI Observatory.

Secondly, Company 3 employs Steps Connect to create targeted communication campaigns by building a target persona and cross-referencing a series of data to enable precise campaign planning based on user consumption habits, while ensuring data remains anonymized. The system constructs an audience pool estimated to be interested in specific job opportunities, purchases ad space from Meta, and delivers tailored content directly to that segmented target audience. This approach leverages tailored recommendations to align job opportunities with candidates' interests. Given these features, the solution is categorized in the AI Solutions Family as Tailored Recommendations for Job Candidates' Interests and is classified under the *Recommendation System* class by the AI Observatory.

Thirdly, Company 3 has developed a human-like avatar that acts on behalf of the recruiter to present the company's job offers. This avatar provides a personalized and interactive experience, delivering key information about job opportunities in an engaging and approachable manner, simulating a real conversation with a recruiter. This innovative approach has proven to be more interesting and engaging for the audience, resulting in a reduced time to hire and lower turnover due to better alignment of candidate expectations with the actual work environment. Given its characteristics, this solution is classified under the AI Solutions Family of *Generative AI-based tool for social communication* and is placed in the *Generative AI* class as per the AI Observatory classification.

5 | Conclusions and future developments

In this chapter, an overall reflection on the results of the study is presented in order to respond to the **Research Objective: Examine the state of the art of innovative AI-based solutions applied to Human Resource processes and evaluate their impact within Italian organizations**. The implications of the findings in relation to the existing literature are discussed, highlighting how they may confirm, contradict or enrich previous knowledge. In addition, the chapter explores the theoretical contribution of the work and provides useful guidelines for practitioners in the field, where applicable.

Next, a discussion of the limitations of the study is addressed, including methodological constraints and the scope within which the results can be considered reliable. These limitations offer the cue to suggest possible future developments in the research. Finally, the chapter concludes with a summary of new perspectives that have emerged, highlighting the main innovative contributions that this research has made to the field of study.

5.1. Conclusions from startup mapping

This section presents the results that emerged from the mapping of startups in order to answer **Research Question 1: What are the innovative trends in the international market for AI-based solutions applied in the HR processes?**. The mapping allowed us to gain insight into the sectors with the highest concentration of startups, the types of solutions offered, and the forms of Artificial Intelligence that are receiving the most investment, both globally and with a specific focus on Italy. The results provide essential insights into how new entrepreneurial entities contribute to innovation and what factors may favor or hinder their success.

Startups are by nature innovation-oriented organizations and are often a driver of transformation in the industries in which they operate. Defined as "temporary organizations in search of a scalable and repeatable business model", startups aim to identify unique

and scalable solutions to existing problems, challenging traditional models (Ries, 2013). In Italy, this distinctive feature is formally recognized by Decree-Law 179/2012, which identifies "innovative startups" as companies that offer products or services with high technological value, thus promoting innovation and competitiveness in the national market (Governo Italiano, 2012). Thanks to their organizational flexibility and risk appetite, startups are pioneers in the adoption of advanced technologies, like Artificial Intelligence, Internet of Things (IoT) and automation, supporting the technological evolution of the industrial ecosystem and facilitating the adoption of innovative solutions even by more established companies.

The following sections will present the outcomes that emerged for each attribute of interest considered in the research.

5.1.1.   Emerging trends in macro processes and processes

From the analysis of emerging trends for macro processes and processes, a few key trends stand out. First, the strategic focus on *Attraction* emerges clearly: 55.30 percent of the startups considered focus on this macro process This offering seems to reflect a widely perceived need in the marketplace, namely talent attraction, indicated as one of the main areas of investment and innovation in organizational strategies.The stability of this trend over time suggests an entrenched demand for solutions that can optimize attraction processes. As highlighted in the literature, companies increasingly feel the need to be attractive to top talent, and Artificial Intelligence can be an effective tool to address this need.

This global trend in attracting talent is also confirmed in Italy, as highlighted by the HR Innovation Practice Observatory study, which identifies talent attraction as one of the main priorities of HR management for 2024. Despite positive signs such as the increase in the share of employees and permanent contracts, the Research shows that organizations are increasingly struggling to fill vacancies, a difficulty attributable to the lack of specific skills and the scarcity of candidates.

Within the *Attraction* macro process, there is limited representation of *Employer Branding* solutions. Unlike *Recruiting* and *Selection* processes, which maintain a stable presence over time, employer branding-focused solutions appear to a lesser extent in the dataset. This may reflect a twofold reality: on the one hand, the methodology adopted mapped only the main solution for each startup; on the other hand, this may be a market trend, where employer branding is integrated into broader attraction and retention solutions or considered an added value, rather than a stand-alone solution. As a result, startups

may perceive employer branding as a cross-cutting component of employee attraction and management strategies, rather than a specific technology domain

Although *Attraction* maintains a dominant position, there is a slight decline in its representation, from 59.42 percent in the first two-year period (2020-2021) to 53.78 percent in the second (2022-2023). This decline can be explained by the increase in interest in other areas, particularly *Employee Well-Being*, whose relevance has increased significantly in the post-pandemic period, rising from 10.11 percent in the 2020-2021 biennium to 22.73 percent in 2022-2023.

Interest in *Employee Well-Being* is growing strongly. This trend reflects the increasing importance placed on employees' psychological and physical well-being, in line with current theories on the future of work that place quality of work life, job satisfaction, and work-life balance at the center. Research indicates that the health crisis has catalyzed a transformation in corporate priorities, bringing *Employee Well-Being* to the fore as a crucial element in the productivity and sustainability of organizations (Violini and Brown, 2020).

In parallel, the *Learning & Development* macro process maintains a steady and significant presence in the startup landscape, signaling stability in interest in training and skills development solutions. In a labor market characterized by rapid technological change and increasing demand for retraining, the provision of innovative AI-based learning tools can be an essential element for the competitiveness and resilience of organizations.

5.1.2. Emerging trends in AI Observatory Classes

From the analysis of emerging trends for AI Observatory Classes, some key trends stand out. Among them, *Recommendation System* emerge as the most represented class, with a presence in 41.47 percent of startups. However, despite the increase in the overall number of startups, the relative percentage of *Recommendation System* has declined by about 10 percent over the past two years from 2020-2021. This decline suggests a diversification of solutions, with the attention of startups spread across multiple alternatives. However, the established interest in these solutions, which are essential for optimizing selection processes and matching candidates with open positions, remains evident. Globally, *Recommendation System* continue to attract the highest volume of cumulative funding, confirming their strategic importance. Although a gradual reduction in average funding per founding year is observed, it remains at high levels compared to other classes of AI, signaling a market maturity and return on investment that continues to attract significant capital.

In parallel, *Generative AI* stands out as an emerging class of great interest, adopted by 33.64 percent of HR startups. The analysis shows an increase in the presence of GenAI, rising from 30.4 percent of startups in 2020-2021 to 35 percent in 2022-2023, with a doubling of startups adopting this solution. This trend suggests that GenAI is becoming a crucial element in the digital transformation of HR, opening up new possibilities for automation and personalization. Solutions based on GenAI and recommendation systems are particularly popular because of their ability to directly address key HR challenges. For example, they can enable matching between candidates and open positions, and they can offer specific content recommendations to candidates, such as articles, training videos, refresher courses, or hands-on simulations, that address their skills, interests, or the needs of the position for which they are applying. This targeted and relevant content makes the candidate experience more personalized and interactive, enabling greater engagement and a candidate journey that actively supports them in developing the skills most in demand for the desired role. making their experience more personalized and interactive. On the corporate side, these systems can suggest career paths, identifying internal growth opportunities based on the employee's skills and interests, and are also taking on a growing role in employee well-being, offering personalized advice that enhances the overall work experience and individual well-being.

On the other hand, *Generative AI* offers considerable potential for personalizing interaction with both candidates and employees by automating content creation and streamlining communication management. This technology enables the creation of a more engaging and tailored HR experience, facilitating continuous communication tailored to the specific needs of individuals.

In contrast, *Image & Video Analysis* shows a limited presence in the dataset and a significant drop in average funding. This finding suggests that the market perceives these solutions as less strategic or urgent than other AI technologies that address more immediate operational needs In addition, regulatory uncertainty, such as that arising from the European AI Act, could affect business confidence in this technology, discouraging new investment and limiting adoption in favor of AI solutions with more immediate impact and less subject to regulatory restrictions.

The dataset shows that startups using *Image & Video Analysis* technologies are predominantly located outside Europe. This finding reflects the influence of European regulations on privacy and ethical use of Artificial Intelligence, which are more stringent than those in other countries. In particular, the European AI Act classifies AI systems into four risk categories: unacceptable, high, limited, and minimal. Video and image analysis technologies may fall into the "high risk" or, in some cases, "unacceptable risk" categories, leading

to restrictions or bans on their use. This regulatory framework makes it more complex and costly to develop and deploy such solutions within the EU, prompting startups to prefer markets with less restrictive regulations.

Europe's focus on data protection and transparency in the processing of personal information would therefore be a significant barrier to the development of *Image & Video Analysis* solutions. As a result, European startups might move toward offerings that are less subject to regulatory restrictions, while international startups without similarly stringent regulatory constraints would seem more likely to explore these technologies. operating in contexts with less stringent constraints, it appears possible to explore these technologies more safely and with reduced risks than in the European regulatory landscape.

The trends highlighted in this analysis are in line with the AI Solution Families identified in section 4.1.1, classified as innovative because they are the result of a mapping of startups, which, as noted earlier, represent key sources of innovation. Specifically these are: Interview counducted by an AI-generated recruiter, AI-generated testing based on a simulation of real life scenarios, Real-time recruiter support for the interview, AI-based support to increase efficiency in meetings, and Emotional support for employees based on video analysis. These new AI Solution Families clearly reflect the major trends in AI solution offerings to support HR. Significantly, the first four new families listed belong to *Generative AI*, thus highlighting the central and strategic role of this technology for the future of the industry, as discussed in previous chapters.

In addition, three of these new families (Interview counducted by an AI-generated recruiter, AI-generated test based on a simulation of real life scenarios and Real-time recruiter support for the interview) are in the *Attraction* macro process, confirming the strong orientation of organizations toward talent attraction, an area recognized as a priority in HR strategies. In contrast, the Emotional support for employees based on video analysis family belongs to the *Well-Being* macro process, which is considered an increasingly relevant aspect in the HR context, especially following the pandemic-induced transformations. The emergence of these families reflects a constant adaptation to the needs of the market, with advanced solutions capable of responding to current needs and anticipating future challenges, confirming the innovative character of startups in shaping industry trends.

5.1.3.   Emerging trends in AI Solutions Families

From the analysis of emerging trends in AI Solution Families in HR, a number of key trends emerge that outline innovation dynamics and market priorities.

First, the *Candidate Recommendations Based on Job Offer Matching* solution family appears to be dominant globally, accounting for 32.72 percent of the dataset, more than four times the share of any other category. Although the number of startups in this area more than doubled from 2020 to 2023, the overall representation of these solutions decreased slightly, from 37.08 percent to 29.69 percent. This trend suggests a diversification of technology offerings that reflects a growing interest in other areas of innovation as well. Despite the decline in average funding, *Recommendation System* continue to be considered a strategic component for the efficiency of candidate and position matching processes.

The second AI Solution Family by diffusion is *Data Analysis for Assessment of Well-Being and Prevention of Stressful Situations* , covering 9.22 percent of the dataset. This category shows strong growth, increasing in representation from 7.25 percent in 2020-2021 to 11.72 percent in 2022-2023. This trend reflects a growing focus on *Employee Well-Being*, an increasingly important priority in Human Resource Management to promote a sustainable work environment and improve work-life balance.

Another significant trend is *Chatbots Based on Generative AI for Candidate Profiling* , which saw a doubling in the number of startups between the first and second two-year periods considered. This reflects companies' focus on talent attraction and the use of GenAI to improve candidate interaction and profiling by providing a personalized and engaging experience.

Platforms for Creating New Well-Being Strategies also show significant growth, with an increase in representation from 2.25 percent in 2020-2021 to 7.81 percent in 2022-2023. This increase suggests a growing demand for advanced tools that support *Employee Well-Being* by combining the potential of GenAI with a personalized approach to well-being.

There is also significant growth in Chatbot for Automated Employee Support solutions in 2022-2023, doubling their presence in the dataset. These chatbots streamline internal communications and offer immediate responses to employees, improving operational efficiency and supporting employee engagement. This growth highlights an interest in solutions that improve accessibility to HR services and strengthen employee connection.

An emerging trend involves *Automatic feedback generation* solutions, which, although currently less represented, have seen a significant increase in funding. These solutions, powered by GenAI, have appeared in the 2022-2023 biennium and suggest a growing interest in automated feedback tools that facilitate internal communication and promote continuous employee improvement.

In contrast to the other categories, *Data analysis using gamification-based selection algorithms* solutions do not show a growing trend: they dropped from 4.79 percent in the 2020-2021 biennium to 0 in the following biennium. This decline may reflect a reduced interest on the part of vendors in integrating gamification into selection processes. It is possible that vendors consider these solutions to be less effective in delivering a rapid return on investment or that they prefer technologies with greater maturity and proven operational benefits. In addition, gamification may be perceived as less strategic than more advanced Artificial Intelligence solutions, such as those based on machine learning or predictive algorithms, which better meet the needs for efficiency and accuracy required in modern selection processes.

5.1.4. Financial trends

At the financial level, a negative trend emerges over the years for macro processes, individual processes, AI classes, and AI Solution Families, indicating a possible slowdown in the inflow of investment into startups offering AI-based HR solutions. This decline could suggest a phase of consolidation in the industry, characterized by increased investor caution in funding new ventures, especially in areas where solutions are more mature or subject to increasing competition. This trend also reflects increasing selectivity on the part of the market, with interest increasingly focused on solutions that can demonstrate a clear return on investment and immediate impact. (Figure A.6)

At the same time, the decline in investment could be influenced by increasing regulation and regulatory complexity, as in the case of the European AI Act, which is pushing investors to more carefully assess the risks associated with AI. This financial scenario highlights the need for startups to demonstrate the sustainability and scalability of their business models, with a focus on the most innovative solutions capable of effectively responding to regulatory and market challenges.

Examining the total financial data received from startups, although partially incomplete, confirms the trends identified above (Figure A.7). Globally, *Recommendation System* continues to record the highest volume of cumulative funding, demonstrating a stable and established interest in these technologies. However, attention to *Generative AI* is growing, as data from the latest funding rounds show, suggesting a still partly untapped potential for the deployment and delivery of these solutions. The growing adoption of GenAI is favored by its lower implementation costs compared to other classes of AI and its greater ease of use, features that facilitate its integration into business processes and further incentivize investor interest.

5.2.   Conclusions form the interviews

This section presents the results that emerged from the interviews conducted, with the aim of answering the **Research Question 2: What are the impacts of the implementation of AI-based solutions on Human Resource processes within Italian organizations and what are the main barriers to their effective adoption?**. The interviews enabled the collection of qualitative data that provide a direct perspective on the experiences of Italian companies in adopting AI-based solutions for HR processes. The results highlight the types of solutions most adopted by Italian companies, the concrete benefits obtained, the main difficulties encountered during the innovation process and the future goals they intend to pursue. These elements provide a clearer view of the concrete impact of these solutions within organizations, helping to identify both successful practices and areas in need of further improvement, thus helping to paint a comprehensive picture of the current state of innovation in Italian companies.

5.2.1.   Lack of object measurement and KPIs

The objective of the second research question was to analyze the impact of introducing AI-based solutions into key HR processes by studying the indicators used by companies to monitor these processes, and to compare the performance of these indicators before and after the implementation of these solutions. Thus, the purpose was to identify guidelines for managing the introduction into HR processes that would allow for the evaluation of the benefits and improvements that these could bring to companies. However, although this was the main objective of the interviews, the feedback obtained was limited. Most of the companies engaged in discussions reported that no specific KPIs are measured for HR function activities. Among the few that do track some metrics, the approach is generally unstructured and lacks objectivity.

This lack of inclination of HR departments to evaluate through objective parameters of their performance had already emerged in the literature review. In fact, in chapter 2.3.4, a difficulty in finding information related to KPIs was reported, as scholarly papers dealing with this topic are relatively scarce and often too general to allow indicators to be associated with a specific process. In this context, nonacademic literature manages to partially fill this gap thanks to private companies operating in the Human Resources sector that publish articles on their expertise, such as the KPIs that client companies monitor. Despite this, these publications available on the web are sometimes at odds with each other making it difficult to come to unambiguous and reliable conclusions.

Among the few KPIs highlighted during the interviews, most indicators relate primarily to time-saving aspects. In particular, this aspect was reported in the interviews with Cimbali Group, Medtronic, Sace, Vodafone, Company 2, and Company3 regarding various processes. The most recurrent indicators that emerged during the meetings include the reduction of time-to-hire and time-to-fill for a vacant position, referring to the processes of *Recruitment, Selection* and *Career Growth*, as well as the decrease in the time it takes to access the required information thanks to the use of chatbots. Regarding other non-time-related KPIs, in the *Training* process, an increase in people using training content was reported, as reported by Sace and Vodafone, while in the *Well-Being* macro process, an increase in Net Promoter Score was observed, as reported by Sace and Company 1.

Unfortunately, due to the paucity of data collected regarding process performance analysis, it was not possible to understand with sufficient accuracy what benefits and improvements specific AI solutions could bring. As this condition improves, more and more light will be shed on the specific contribution that each implementation makes. This will make it possible, for example, to identify that a particular type of solution allows, on average, a time-based KPI to be halved, and will make it possible to motivate investment in that technology to a company that wishes to reduce the same parameter.

Although this is the current situation, it is speculated that in the future it may improve precisely because of the implementation of digital solutions, including A-based ones, it becomes easier to observe and measure process indicators. Indeed, the use of AI and, in general, other digital solutions requires structured databases and generates large amounts of data, which could incentivize HR departments to move toward KPI-based performance evaluation, thus contributing to a more objective and strategic management of business processes.

Although the study on the impacts of the implementation of AI-based solutions on Human Resource processes did not produce the expected results, the interviews produced valuable findings to answer the second part of RQ2 on the topic of the main barriers and benefits to the effective adoption of these technologies. The following are the analyses related to this topic.

5.2.2. Objectification of the decision-making process

Since the research study context is still in its early stage in terms of the topics covered by RQ2, it was thought that it would be more interesting to focus the study on identifying general evidence, rather than focusing exclusively on specific KPIs. Considering that many Italian organizations are still at an early stage of development, an approach geared

toward providing an overview of the current context might be more effective than the analysis of performance indicators, which would require an undoubtedly higher libel of experience .

The first evidence observed relates to the issue of objectifying decision making, an aspect that was touched upon in several meetings, but particularly during the discussion with the head of the HR function at Cimbali Group.

Discussing the benefits of introducing AI-based solutions to support HR processes, it emerged that historically decision-making in this department has been highly human-centric, left to the complete discretion of the operator. Although in many cases these managers have years of experience and established skills in their work, it remains undeniable that they are still human beings and, as such, subject to cognitive bias.

This vulnerability to bias becomes particularly relevant in sensitive Human Resource Management activities, such as personnel selection or career advancement decisions, where a wrong decision can have long-term repercussions on the quality of company resources. For example, a recruiter might unconsciously favor one candidate over another simply because the latter attended the same university as him or comes from a background similar to his own. This type of bias, known as the similarity effect, could lead to discarding more qualified candidates, with the risk of not selecting the best person for the role, thereby reducing the overall effectiveness of the team and limiting diversity within the organization.

In this context, AI is a great support, as it allows processes to be standardized and bias eliminated, regardless of the person involved. AI-based solutions offer a more objective approach to decision making, reducing the influence of unconscious biases and providing greater consistency and transparency. This aspect was particularly appreciated by Cimbali Group's HR manager, who pointed out that AI allows decisions to be based on concrete, measurable data, rather than subjective perceptions by automatically providing recommendations and reasons for them.

In discussing this evidence, it is essential to emphasize a theme that emerged from both the literature review and the interview with Company 2's HR manager: Artificial Intelligence can be subject to bias if it is not trained properly, using data free of bias. Indeed, Company 2 pointed out that AI, even today, tends to reflect a male bias. This happens because the algorithm used for candidate selection has been trained on historical data collected over years containing more profiles of male employees, resulting in an unintended bias for such figures and helping to perpetuate a bias toward the female gender. In general, as AI learns from the data provided, if it contains biases, they will be incorporated and

amplified in the results produced by the algorithm. Therefore, it is crucial to adopt rigorous practices in the selection and cleaning of training data, as well as to conduct periodic evaluations of model performance to identify and mitigate any bias. Finally, the involvement of multidisciplinary teams during the AI development and testing phases is essential to ensure that diverse perspectives are considered and that decisions are not influenced by narrow views. Only by taking these steps can the risk of bias be reduced and ensure that AI solutions are as fair and reliable as possible, even more so than a human recruiter.

The objectification of decision making is thus an important step toward more equitable and effective Human Resource Management. This type of approach not only reduces errors, but also improves candidate and employee confidence in the HR system, as decisions will be perceived as fairer. Ultimately, the introduction of AI technologies into decision-making processes could be a significant lever for improving the overall quality of HR management by increasing transparency and consistency in strategic choices.

5.2.3. Change agent: the new role of HR

The second element that emerged from the interviews was the recognition of the increasingly central and strategic role of Human Resources within organizations. This role is likely to become increasingly relevant in the future, mainly for two reasons related to training and skills development.

First, HR functions will need to invest in themselves by participating in valuable training courses that enable them to implement technology solutions, whether AI-based or otherwise, with the goal of making business processes more efficient. As highlighted by the literature review, HR departments have historically consisted of professionals who often do not come from technical backgrounds in IT or STEM fields. This lack of technical background makes HR less likely and ready to embark on paths of digitization and innovation, further highlighting the need for specific training to overcome these limitations and foster the adoption of new technologies.

Second, the HR function must assume the role of change agent, becoming the promoter of technological innovation for the entire corporate population. This means that HR not only manages training, but through it must also actively encourage innovation. This is all the more true with regard to the introduction of generative Artificial Intelligence tools, such as chatbots, which stand out for their extraordinary ease of use and high accessibility. Adoption of these tools does not require sophisticated technical skills but rather soft skills such as, for example, the ability to communicate clearly and accurately,

ask effective questions, and critical thinking, which is essential for assessing the relevance and accuracy of the answers provided by the AI.

Given the ease of use of AI-based solutions compared to other digital technologies, as with the example of the adoption of chatbots, it emerged that future training in technology will increasingly focus on the development of soft skills, gradually reducing the importance of strictly technical skills. The ability to critically analyze AI-generated information and to understand how best to apply these tools will become crucial to business success, and the HR department will be called upon to lead this change, becoming a true agent of innovation.

5.2.4.   Security and reliability of Artificial Intelligence

The most discussed topic during the interviews was the security and reliability of AI, which raised concerns and qualms from all the companies involved in the study. This concern is mainly articulated in two aspects: ensuring that the information provided as input remains private and is not absorbed by the algorithm, and the ability of AI to generate correct outputs and overcome the risk of hallucinations, which are those situations in which the system generates false or inaccurate information despite the fact that it appears plausible, becoming difficult for the user to detect.

The first evidence was emphasized by every HR manager interviewed for the research, and all companies, although the level of attention and sensitivity to security varies by business sector, consider this a key element in evaluating which AI technologies to adopt. One possible solution, which emerged during the interviews, is the use of third-party algorithms that are, however, executed within proprietary environments owned and controlled by the enterprise. In this way, it is possible to train Machine Learning models using enterprise databases without running the risk of information leaking out of the organization's perimeter.

As far as observed during this study, the solution most widely implemented for this purpose is Microsoft Copilot, which precisely allows it to be used in a secure manner in addition to integrating seamlessly with the rest of the Microsoft suite, which is already widely adopted by most companies. This feature represents a key element of reassurance for many organizations, which see integration and controlled data management as a key determinant for the adoption of AI technologies.

Output reliability represents the second relevant theme that emerged. An analysis of the critical issues highlighted by HR managers frequently reveals a lack of reliability of data produced by AI-based systems due to the susceptibility of the system to potential

hallucinations and the need for constant user oversight. An example of this emerged during the interview with Vodafone, where it was recounted that although a candidate recommendation system is implemented based on matching CVs and Job Descriptions, the profiles require manual checking by recruiters to verify that the suggestions are indeed correct and to make sure that the AI has not discarded profiles that are in line with the position.

Obviously, proceeding in this way significantly reduces the potential benefits of the solution, as the automation promised by AI is largely negated by the need for manual checking. Companies hope that AI will progressively improve, not only in terms of accuracy and reliability, but also in its ability to autonomously handle tasks that currently require human supervision. This would greatly reduce the effort required for activities that do not add value to HR functions, allowing HR to focus on more strategic, high-value-added tasks.

5.3.   Comprehensive conclusions of the study

After separately evaluating the conclusions derived from the analyses conducted for the two research questions, this chapter compares the results from both sides. This allows to verify which trends observed in the mapping of startups can also be found in the landscape of Italian companies.

5.3.1.   Comparison by macro process and process

This chapter presents evidence from the conjunction of the analysis of the results of the international startup mapping and interviews with companies that are implementing AI-based solutions to support their HR processes regarding trends on macro processes and processes.

Focusing on macro processes, *Attraction* emerges with a significant share of solutions, as six out of seven companies interviewed have implemented initiatives in this area. Moreover, the processes in this area are fairly evenly distributed: three in *Employer Branding*, four in Recruitment and two in *Selection*, highlighting that *Attraction* is a very active topic in terms of ongoing experimentation. In parallel, this evidence also emerges when studying the trends identified by the startup analysis. Indeed, it indicates that globally this process is the most represented in terms of the number of startups offering solutions in this area, in particular *Attraction* represents 55.3 percent of startups internationally and 41 percent of those in Italy.

Ultimately, evaluating the trends related to the macro process *Well-Being*, the analysis of startups showed that globally it is still of reduced relevance compared to the other sectors studied. However, as a result of recent transformations in the world of work, exacerbated by the Covid-19 pandemic, such as the phenomenon of Great Resignation and Talent Shortage discussed in the scientific literature review, *Employee Well-Being* is undergoing a restrained but steady growth in terms of investment. This fact was confirmed precisely also during the interviews with Sace, Vodafone, and Company 1, namely the companies that implement solutions in this area, who were keen to emphasize when for them this aspect is of equal urgency compared to other processes.

5.3.2.   Comparison by AI Observatory Class

Assessing the similarities between the trends identified by both methodologies used to answer the research questions reveals that the distribution of startups across the AI classes defined by the Artificial Intelligence Observatory reflects the distribution observed in the

startup mapping. In particular, from the analysis of the number of solutions globally and the interviews conducted, the *Recomendation System* class emerges as the most implemented out of the total.

This discourse can also be extended to the *Generative AI* and *Data Exploration* classes, which rank second and third, respectively. This shows that although at the Italian level companies are still at a preliminary level of implementing AI-based solutions to support HR processes, they are nevertheless following global trends and are in line with realities in other geographical areas.

5.3.3. Comparison by AI Solutions Families

Finally, the comparison is addressed with regard to the AI Solution Families. Again, one can see the presence of two main trends in common with both. In fact, from the mapping of the startups it appears that *Candidate Recommendations Based on Job Offer Matching* is by far the one that represents the most startups and, the same result is obtained from the interviews. In addition, one of the AI Solutions Families identified as innovative because it emerged from the mapping of startups and not from the study of technologies performed to create the framework, received feedback from the results of discussions with HR managers. The family in question is AI-based support to increase efficiency in meetings and was cited by Sace and Company 2. In addition to confirming the validity of the framework created, it indicates that cutting-edge technological solutions are also being implemented in Italy.

5.4.   Limitations and future developments

During the development of this thesis, certain choices and assumptions were made to achieve the initial objective as effectively as possible. Consequently, these decisions leave room for potential extensions of this work and further related research.

The first consideration that can be made about the limitations of the present research is the choice of scope. Specifically, as extensively described in the methodology chapter, the choice was made to limit the topic studied to three macro processes and seven processes. A potential development of the research could be to assume considering additional HR processes, such as Onboarding or Payroll, or macro processes such as Administrative Management.

Second, it is recommended to expand the preliminary mapping of AI solution vendors used to build the AI Solution Families in order to make the framework even more accurate. Similarly, regarding the mapping of startups, it is again suggested to expand the analysis by increasing the sample of startups studied. This could be done through the use of a higher number of keywords or more permissive filters in terms of year founded or date of last funding than used in this dissertation. The analysis revealed a shortage of historical data that would have facilitated trend identification; therefore, a temporal extension of the mapping is recommended.

In order to address the scarcity of data that in some cases limited the ability to draw relevant conclusions, it is suggested that additional databases be used from which to extract startups, allowing for a larger sample and more accurate analysis. In addition, it would also be useful to find more structured and comprehensive data in terms of year founded, investments raised, geographic area of ownership, and scope to allow for further detailed analysis than was performed for this thesis.

An additional limitation that affected the conduct of this study was the choice to classify startups with respect to attributes in unique manners, that is, with a single AI Observatory Class or AI Solutions Family. In the future, to create an analysis more representative of the state of the art, it is suggested that this boundary be removed and allow a startup to represent multiple solutions.

Regarding the recommended future developments as a result of the constraints from the analysis of the interview results, two main elements were identified. First, the number of companies involved could be increased to increase the sample and the resulting relevance of the conclusions obtained. Second, greater diversification in terms of size and geographic scope of the companies interviewed would have been useful, as only large Italian companies

with a turnover of more than 1 billion euros in 2023 were selected in this study.

Finally, a consideration related to the second research question and study on the impacts of artificial intelligence solutions to support HR processes implemented by Italian organizations is reported. To date, as the innovation environment is still at an exploratory stage, companies have not yet begun to assess performance indicators in a structured manner. It will be interesting to perform this research again in the future, when companies have reached sufficient maturity to allow this type of evaluation as well. In addition, it might be conceivable to carry out both a quantitative analysis through a survey so as to realize a complete picture of the state of technology deployment and the use of KPIs.

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A | Appendix A

This appendix presents an overview of the frameworks resulting from the mapping of startups used in the study in the first section, followed by charts that provide a more comprehensive view of the overall analysis in the second section.

A.1. Startup Mapping

The table below provides an overview of the identified AI solution families. Families represented in white are derived from the AI Solutions mapping and taxonomy (Paragraph 3.5.1, whereas those highlighted in yellow indicate new AI solution families identified through the analysis of startups (Paragraph 4.1.1).

Macro Process	Process	Technologies Familiy Codes	AI Solutions Family	AI Observatory Class	Startup Count		Percentage on partials		Percentages on total			Italian Startups
Attraction	Employer Branding	T1	Generative AI-based tool for social communication	Generative AI	3	4	2,50%	3,33%	1,38%	1,84%		0
		T2	Tailored recommendations for job candidates' interests	Recommendation System	1		0,83%		0,46%			0
	Recruiting	T5	Candidate Recommendations Based on Job Offer Matching	Recommendation System	71	84	59,17%	70,00%	32,72%	38,71%		5
		T6	JD Generation	Generative AI	3		2,50%		1,38%			0
		T7	Automatic filling of candidate profile using the existing CV	Text Analysis	10		8,33%		4,61%			1
	Selection	T8	Data analysis using gamification-based selection algorithms	Data Exploration	5	32	4,17%	26,67%	2,30%	14,75%	120 / 55,30%	0
		T9	Chatbots based on generative AI for candidate profiling	Generative AI	17		14,17%		7,83%			0
		T10	Automatic candidate profiling from video interviews	Image & Video Analysis	4		3,33%		1,84%			0
		T11	Automated post-interview feedback generation	Generative AI	1		0,83%		0,46%			0
		IT1	Interview counducted by an AI-generated recruiter	Generative AI	2		1,67%		0,92%			0
		IT2	AI-generated test based on a simulation of real life scenarios	Generative AI	2		1,67%		0,92%			0
		IT3	Real-time recruiter support for the interview	Generative AI	1		0,83%		0,46%			0
Learning & Dev	Career Growth	T12	Suggestions on reskilling based on future career vision	Recommendation System	8	22	13,33%	36,67%	3,69%	10,14%		2
		T13	Suggestion for relocation of employees based on skills	Recommendation System	4		6,67%		1,84%			2
		T14	Analysis of missing skills for maintaining competitiveness	Data Exploration	10		16,67%		4,61%			0
	Feedback Management	T15	Creation of feedback-based summary reports	Data Exploration	2	15	3,33%	25,00%	0,92%	6,91%	60 / 27,65%	0
		T23	Analysis for improving the quality of internal communication	Text Analysis	1		1,67%		0,46%			0
		T16	Automatic feedback generation	Generative AI	8		13,33%		3,69%			0
		IT4	AI-based support to increase efficiency in meetings	Generative AI	4		6,67%		1,84%			0
	Training	T17	Recommendations courses tailored to the employee's interests	Recommendation System	3	23	5,00%	38,33%	1,38%	10,60%		0
		T18	Chatbot that answers employees' questions in an automated way	Generative AI	8		13,33%		3,69%			2
		T19	Performance analysis through gamification-based training processes	Data Exploration	1		1,67%		0,46%			0
		T20	Automatic generation of tests, quizzes and training content	Generative AI	11		18,33%		5,07%			0
Well-Being	Employee Well-Being	T21	Data analysis for assessment of well-being and prevention of stressful situations	Data Exploration	20	37	54,05%	100,00%	9,22%	17,05%	37 / 17,05%	2
		T22	Platform for creating new wellbeing strategies	Generative AI	12		32,43%		5,53%			0
		IT4	Emotional support for employees based on video analysis	Image & Video Analysis	1		2,70%		0,46%			0
		T24	Customized recommendations of events and business services to improve engagement	Recommendation System	4		10,81%		1,84%			0
			Totali:		217				100%	100%	100%	14

Figure A.1: Quantitative analysis of startup mapping outcomes.

A.2. Solution Trends from 2020 to 2023

This section presents charts illustrating the growth of startups from 2020 to 2023. The data is organized by founding year, mapping startups according to their macro-process, specific process, AI Observatory Class, and AI solution families. This provides a detailed overview of the evolution and trends in the solutions proposed by startups during this period.
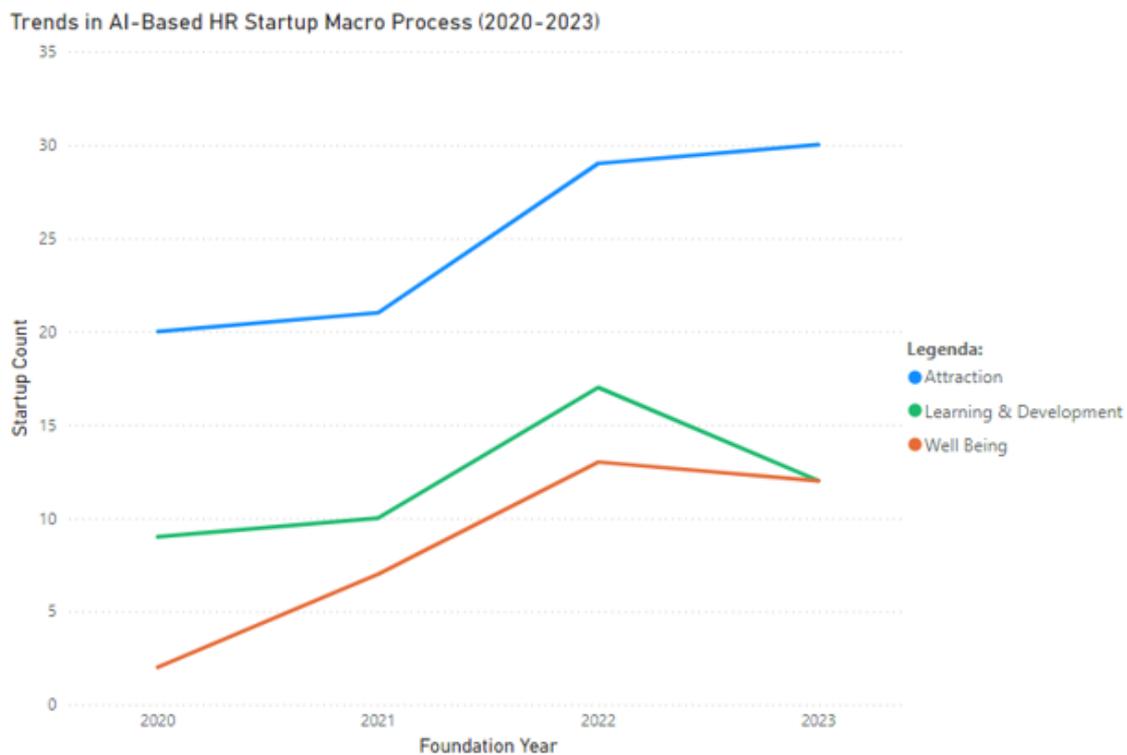

Figure A.2: Trends in AI-Based HR startup macro process (Variation in total number of startups between 2020 and 2023 categorized by macro process.
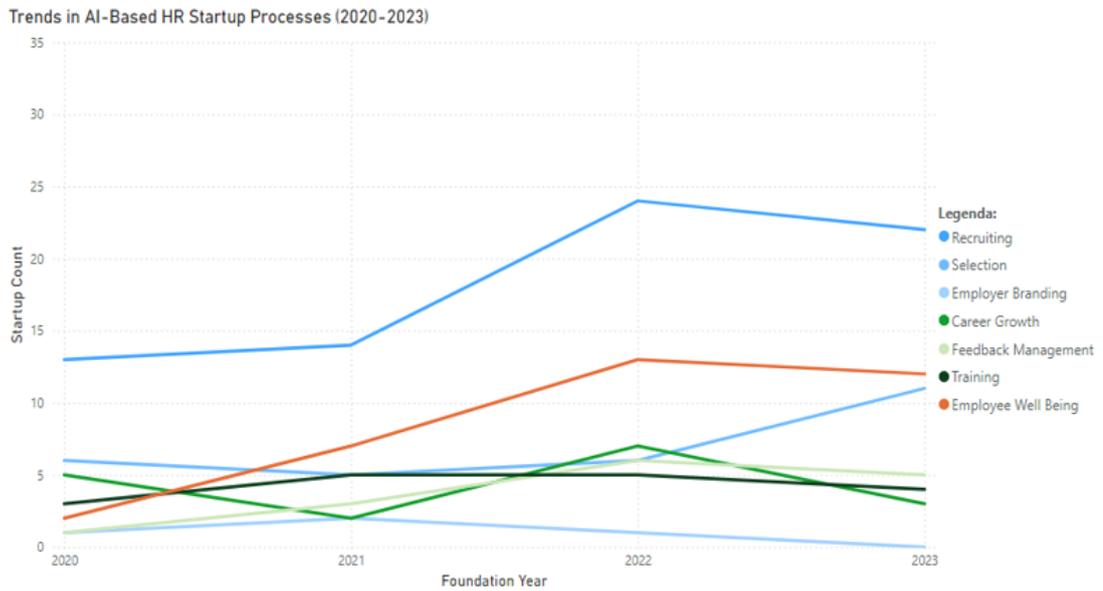
Figure A.3: Variation in total number of startups between 2020 and 2023 categorized by process.
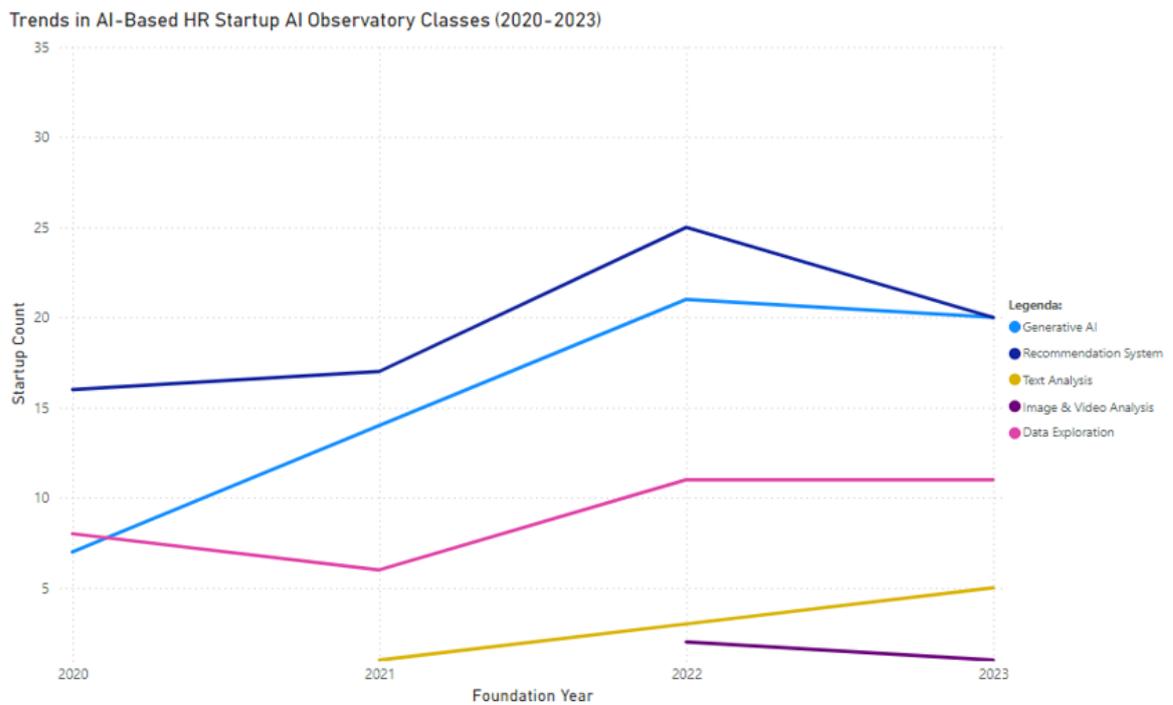

Figure A.4: Variation in total number of startups between 2020 and 2023 categorized by AI Observatory Classes.
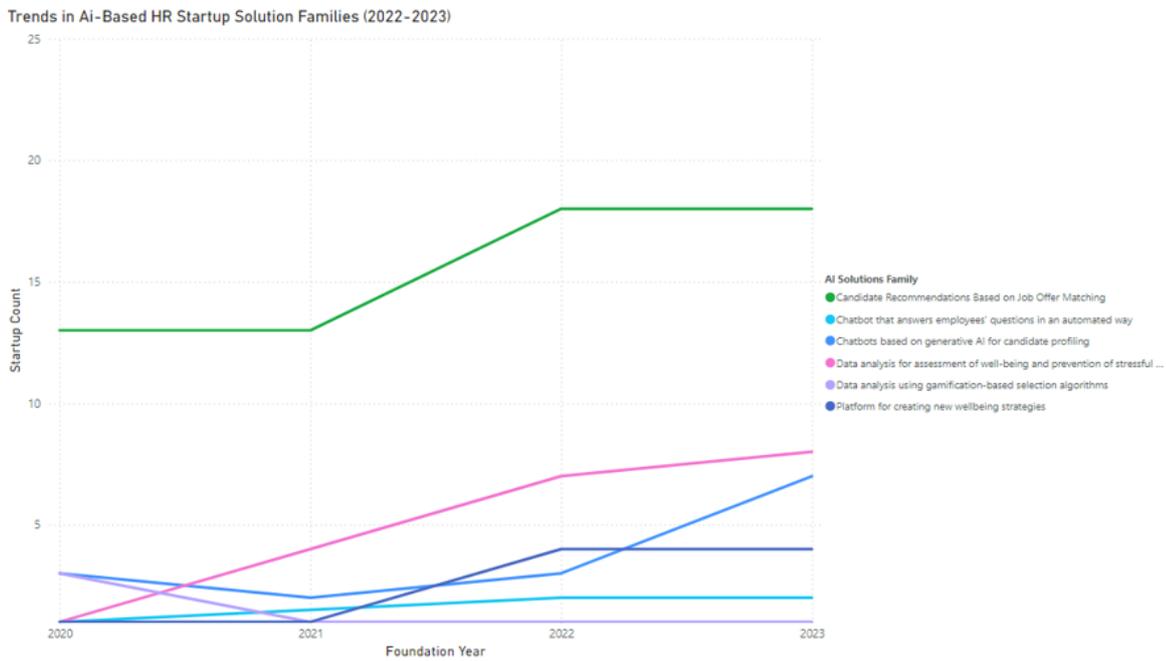
Figure A.5: Variation in total number of startups between 2020 and 2023 categorized by AI Solutions Families.
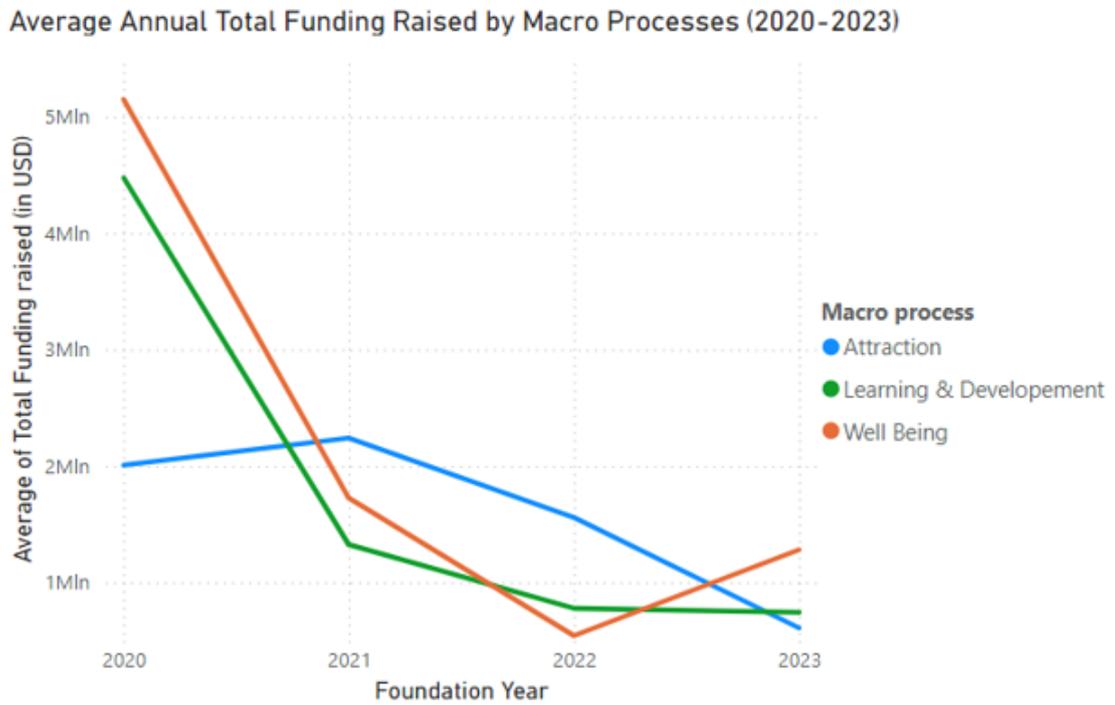
Figure A.6: Variation in average founding raised by startups between 2020 and 2023 categorized by macro process.
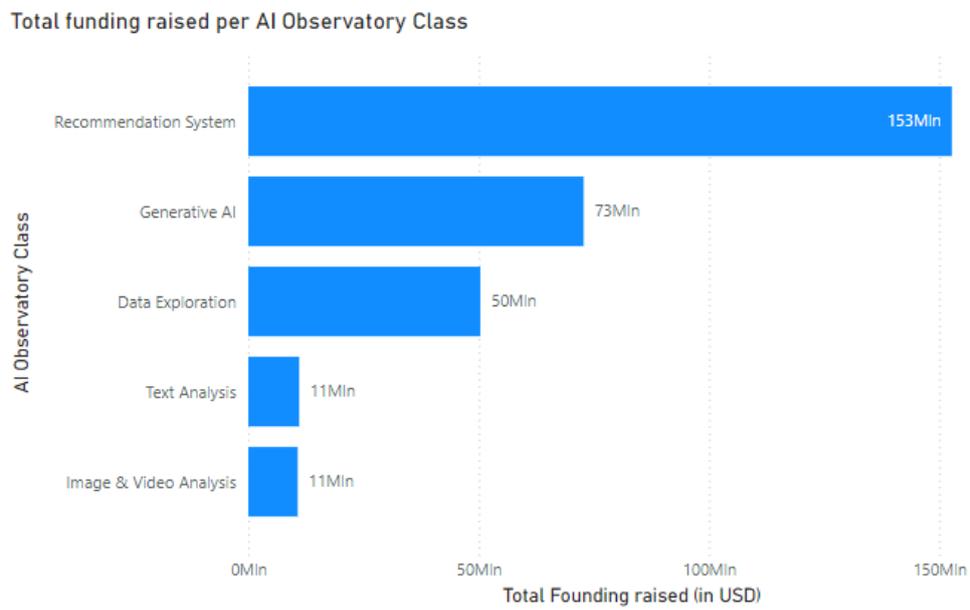
Figure A.7: Total amount of founding raised by startups categorized by AI Observatory Classes.

B | Appendix B: transcripts of the interviews

This Appendix contains the complete transcripts of the interviews conducted. In order to maintain the integrity of the original discourse, the transcripts will be presented in the language in which they were originally conducted, namely Italian.

B.1. Cimbali Group

Q: La nostra prima domanda riguarda le tecnologie basate sull'intelligenza artificiale che attualmente usate nelle vostre pratiche HR. Potresti raccontarcele nel dettaglio, partendo anche dai dati che utilizzate, da chi nella vostra organizzazione è responsabile delle decisioni di implementazione e poi anche come funzionano queste tecnologie. Grazie.

A: Prego, noi attualmente a livello di intelligenza artificiale la utilizziamo applicata al sistema di AI generativa interna, oltre che l'utilizzo di Copilot, quindi tutto ciò che è integrato al sistema Microsoft per elaborazione di piani di sostenibilità e piani di comunicazione interna. Voi sapete cos'è un'ATS? Un sistema, facendolo in maniera molto banale senza tradurre l'inglese, che non è utile, ci consente di analizzare molto bene le candidature ricevute. Detta così sembra poco, ma è fondamentale. Abbiamo per alcune posizioni una mole importante di risorse che si candidano. In qualche modo il tasso di conversione di queste candidature in candidati, quindi figure che possono concorrere in maniera positiva alla posizione e consentirci di ottimizzare il processo, quindi in tema di riduzione di tempi, è utile investire su strumenti quale l'intelligenza artificiale. Questo perché? Perché in qualche modo ci screma una parte del lavoro, che è quella dello screening, quindi di andare ad aprire tutti i profili e valutarli, ci crea la possibilità di oggettivare la scelta fatta, perché preimpostando dei parametri che escludano parlamenti quali il sesso, l'etnia, la religione, quindi parametri discriminanti perché il sistema ce li blocca, possiamo in qualche modo gestire quelli che sono le candidature che si allineano più a quelli che sono i criteri di ricerca piuttosto che altre.

Quindi in questo circolo ci comporta, innanzitutto, meno tempo, c'è sempre una supervisione del capitale umano. Quindi in qualche modo l'intelligenza artificiale non si sostituisce al recruiter, e non deve farlo secondo me, non siamo ancora pronti in qualche modo, ma ottimizza il tempo a disposizione. Prima parlavo dell'oggettivizzazione del risultato, perché? Perché in qualche modo nei processi di selezione, voi avete sentito parlare di bias cognitivi, quindi in qualche modo quando abbiamo delle dei pregiudizi, piuttosto che delle idee che si possono basare anche, banalmente siamo esseri umani, io ho fatto psicologia, quindi sono deviato da questo punto di vista, però molte volte noi ce li facciamo banalmente dalla foto che hai personalmente sul curriculum, da se hai vestito elegante o meno, perché c'è uno studio che dice che le persone nel momento in cui vivono un momento stressante della loro vita non vedono tendenzialmente di buon occhio le persone che stanno meglio di loro, quindi che hanno un aspetto pulito, simpatico, allegro, ben vestito, ben curato. Può sembrare un paradosso, ma la mente umana vive per affinità e riflessi, in qualche modo cerca di affiancarsi a persone che hanno il loro stesso stato d'animo. E come lo fai a capire? Il problema è che siamo molto superficiali nella valutazione del nostro cervello, ci mette veramente molto poco a percepire le affinità dell'altra persona, quindi in qualche modo anche cosiddetto standing, tutto ciò che riguarda anche come appare, come ti vesti, a come ti atteggi, crea una valutazione conscia o inconscia della nostra mente. Questo per spiegare che cosa? Che la persona che fa la selezione è una persona, quindi emozioni, problemi, situazioni personali che accompagnano la propria vita lavorativa. L'intelligenza artificiale non ha questo tipo di situazione, quindi che consente di fare delle valutazioni basate ai parametri oggettivi e scegliere la persona non in base a come si pone, ma in base a quello che è il contenuto del suo percorso professionale, perché di fatto in questa fase dobbiamo scegliere il professionista e non la persona. A scegliere la persona invece tocca l'esperienza e le competenze del recruiter, in cui in qualche modo va a sondare con competenze che si spera abbia, se la persona, il professionista che è stato già scremato, già scremato, si possa facilmente adattare a quello che è il contesto aziendale. Perché è importante quindi utilizzarlo? Perché in qualche modo eviti di escludere le processi di selezione delle persone soltanto perché hai dei bias.

Quindi in qualche modo sai che i candidati, 10 candidati che manderai in long list, sono candidati che rispecchiano dei parametri che hai concordato con l'HR Business Partner. Quindi con quelle figure che in qualche modo dialogano quotidianamente con la line, euindi con i tuoi, in qualche modo, clienti interni, coloro che sono un po' il committente del lavoro che stai svolgendo. E visto che le HR andrà sempre di più su una deriva analitica, avete sicuramente sentito parlare della HR Analytics, dello Human Capital Management, ecco io solitamente ho un portato in aziende al sistema di HCM, e ne

gestisco la struttura, seppur con due colleghe, proprio perché andare a utilizzare gli aspetti digitali anche all'interno delle funzioni di risorse umane è fondamentale perché ci consente di analizzare e monitorare tutti i vari dati. Applicare questo sistema ad alcuni processi che sono già, come dire, avviati ci consente di farli meglio, di migliorarli, di fare anche un benchmark con quello che si faceva prima e di limitare quello che è, lo dico bene, l'impronta dell'essere umano sulla oggettivizzazione del risultato. Perché troppo spesso, e parlo di un'azienda imprenditoriale come la mia, in cui purtroppo o per fortuna dipende dai casi, il punto di vista soggettivo viene prima della competenza o del merito oggettivo. Questo è un dato di fatto. Proprio perché siamo esseri umani. Quindi, il punto di forza dell'intelligenza artificiale, dei sistemi digitali, è quello di consentirci di oggettivare le scelte. Io la metterei in grassetto, questo, perché per me, quando ho raccontato a Management Team, all'ora direttore generale, perché investire tanto denaro su un processo del genere, è stata la frase che ho detto, che gli era piaciuta e a cui credo molto, è oggettivare le scelte. Prima parlavamo di sostenibilità, sapete tutti quanti gli SDGs in qualche modo ci obbligano e ci impongono delle scelte, ci obbligano di contare, di fare un piano strategico almeno triennale e di poi fare dei report annuali proprio perché deve essere analizzato, monitorato, in qualche modo quello che si fa, quello che si dice deve pesare a livello analitico, se non diventa veramente cosiddetto greenwashing, che tanto si sente anche sui social. Stessa cosa è applicata alle risorse umane, l'azienda è fatta principalmente di persone, poi di numeri e poi ancora di fatturato. Quindi perché se ne parliamo in termini di sostenibilità non bisogna parlare in termini di persone, perché sapete benissimo che tra i pilastri della sostenibilità sono oltre che l'ambiente, la governance, c'è anche l'aspetto sociale e nell'aspetto sociale ci sono ovviamente le persone.

Seguendo questo concetto, è anche utile dotarsi di strumenti che ci consentano di amministrare correttamente e gestire correttamente il nostro human capital. Per fare questo ovviamente le aziende, cosa abbiamo fatto noi, non è semplice dire pago un consulente, pago un fornitore che mi dota in un sistema ATS che utilizza intelligenza artificiale per quel tipo di processo, ci devono essere situazioni di contorno che in qualche modo ci impongano anche in maniera volontaria perché poi deve partire da una la volontà propria di attuare modelli che ci consentano di essere misurabili anno su anno e valutarne anche il miglioramento continuo, nell'ottica Kaizen. Sapete che cos'è il Kaizen? Non do nulla per scontato. E quindi come si può fare questo? Si può fare banalmente concorrendo a delle certificazioni ISO o UNI, questo ci consente di avere un audit da un ente esterno, che non ha interessi con l'azienda, e di raggiungere quelli che sono i KPI che la normativa applica, sia in termini qualitativi che in termini quantitativi, di riuscirci a misurare su quello che è un year zero e valutare year to year quelli che sono gli indici di miglioramento, almeno

su un triennio. Questo ci permette di fare che cosa? Di mettere in pratica il cosiddetto piano strategico che ovviamente tutte le aziende fanno quando parlano di sostenibilità e innovazione, perché lo devi fare, perché l'anno dopo te lo vengono a controllare e vedono che cosa hai migliorato. Dichiarare un budget con delle commesse specifiche. Nelle commesse di sostenibilità io ho inserito tutti quelli che sono i processi di digitalizzazione e l'intelligenza artificiale per la funzione delle risorse umane, tra cui quello che vi raccontavo prima.

Noi nel marzo 2024 ci siamo certificati un IPDR 125 2022, che è la normativa italiana quindi il perimetro è esteso soltanto alla capogruppo, quindi Cimbali Group SPA, sulla parità di genere. Voi direte, cosa c'entra con l'intelligenza artificiale? C'entra perché nella certificazione i KPI valutati sono qualitativi e quantitativi, su quelli quantitativi valutano l'organico, come il numero di donne rispetto al numero di uomini compiegati in azienda, indipendentemente dalla funzione, quindi fanno il totale, noi invece in un'azienda produttiva abbiamo la fabbrica, e storicamente in fabbrica sono impiegati uomini. Al certificatore non gli interessa dire, ma no, ma voi, è un'azienda industriale, poverini, ci sta che ci siano più uomini, non gli interessa. Se lo vuoi fare, sai benissimo che in qualche modo quello è il totale su cui l'avrai valutato, e loro pretendono che tu anno su anno migliori, quindi da tuo quantitativo da dover analizzare e migliorare. Dati qualitativi tu presenti un piano strategico che dici io farò tot azioni di miglioramento per far sì che ci sia un'equità a livello di selezione, un'equità a livello di sviluppo e coinvolgimento e formazione, equità in termini di equità salariale, di discriminazione e molestie, di genitorialità e cura eccetera eccetera che sono poi pillars che compongono una politica delle persone richiesta da un PDR. Quindi questi temi qualitativi come faccio ad attualizzarli? Ci viene il supporto creare sistemi di valutazione, dotandosi anche di strumenti come quelli digitali, come l'esigenza artificiale. Per farlo, ve ne cito uno, abbiamo avuto l'esigenza di dover colmare, anzi in realtà due, è una cosa che è appena iniziata, due processi che erano un po' zoppi, il primo che rientra sempre nel performance management system, quindi nella notazione delle prestazioni delle persone, e il secondo nei piani informativi.

Nella parte di gestione della formazione ci siamo resi conto che dotarci di fornitori che applicano l'intelligenza artificiale in base a quelli che sono delle valutazioni preventive, di quelle che sono le mancanze formative della persona, indipendentemente dalla valutazione che fa il proprio manager. Parliamo della lingua inglese. Io posso dire tu parli bene inglese, ma è una mia valutazione, a meno che io non sia un docente, madrelingua è una mia valutazione soggettiva. Utilizzare dei sistemi che fanno una valutazione anche dotandosi dell'analisi del linguaggio, dello speaking, attraverso l'intelligenza artificiale, fa una valutazione di partenza del nascente e crea automaticamente un piano formativo ad

hoc per quella persona. Quindi anche qui non c'è una discriminante, perché il rischio qual è? Che poi io voglio puntare su un ragazzo perché voglio mandarlo all'estero e gli faccio un piano formativo di inglese molto più intenso, dicendo che secondo me questa è l'esigenza e crea una discriminazione, di fatto, perché lui deve avere questi tipi di valutazione e di formazione che può avere la sua collega. Oltre al fatto che facendo così ci priviamo di una persona che faccia questo lavoro, per l'azienda è un costo risparmiato. Ve la dico tutta però visto che questo è.

Sulla parte di performance noi abbiamo rivisto, grazie all'HCM, che abbiamo implementato in parte in-house, in parte grazie a una società esterna, un sistema di appraisal. Sapete che cos'è un appraisal? L'appraisal è un sistema di valutazione di quello che è l'allineamento o meno in base al modello di leadership dell'azienda, dei comportamenti agiti dei vari professionisti. Quindi in qualche modo l'azienda pubblica un modello di leadership in base ai comportamenti che sarebbero da condurre e quelli da non condurre in azienda, indipendentemente dal ruolo che ricopri, quindi se sei un dirigente o uno stagista è uguale, e si fa una valutazione dell'allineamento in base alla valutazione che fai tu come autovalutazione, la valutazione top down che fai per i responsabili su di te. Poi c'è una valutazione della mappatura delle competenze interne, cioè io manager devo essere responsabilizzato nel valutare se le competenze di una risorsa siano facilmente reperibili all'interno dell'organizzazione e quanto siano difficilmente reperibili all'esterno. In qualche modo creo una valutazione %uale di quanto corro il rischio di perdere la risorsa e quanto ci metterei a trovare un dipendente come quella risorsa. Questo cosa va a comporre? Nell'ascissa, nell'ordinata, va a creare dei quadrati, magari non li avete già sentito parlare, che si chiamano Ninebox. Nella valutazione del Ninebox vado a confrontare l'allineamento al modello di leadership, quindi comportamenti agiti, cosiddetti soft, alla valutazione della performance e alle competenze hard. E per poterlo fare, questo incastro, utilizzo l'intelligenza artificiale che mi aiuta a visualizzare graficamente quello che il mio team è, come si predispongono e come si dispongono le competenze che ho all'interno dell'azienda.

Altra cosa, questo sistema in qualche modo va a creare un coefficiente di riproporzionamento della valutazione MBO. Sapete che cos'è MBO? Managing By Objective, quindi è un sistema incentivante che serve in qualche modo per creare un sistema incentivo alle persone, assolutamente si può fare annuale, in base a dei progetti e degli obiettivi che vengono assegnati. Abbiamo valutato di voler in qualche modo aumentare o diminuire questo valore anche in base al coefficiente che usciva dalla notazione di appraisal. Immaginate che farlo a livello umano il rischio era che qualcuno mi stesse più simpatico, lo riproporziono in più, qualcun altro penso che non sia, magari lo faccio anche in maniera

strategica, non sia la persona su cui investire quest'anno e quindi lo riproporziono con un demoltiplicatore. Questa scelta diventava un pochino rischiosa, quindi abbiamo voluto applicare anche qui l'intenza artificiale per, in base a quelli che erano parametri che venivano già inseriti, automaticamente e riparametrare il risultato in base a quello che l'obiettivo ha segnato.

Q: È molto interessante, grazie. Hai risposto a un sacco di questioni sulle quali avevamo un grande interesse a riguardo. Abbiamo parlato di tutti aspetti positivi, avete riscontrato anche alcune criticità, o comunque difficoltà nell'implementazione di queste nuove pratiche?

A: La grande difficoltà è che per chi non è attivo digitale interfacciarsi con questi strumenti c'è un grande scetticismo. Noi siamo un'azienda storica con persone che in qualche modo hanno ruolo in azienda da tanto tempo e che quindi in qualche modo non sempre vedono di buon occhio la digitalizzazione del processo. Un po' in parte anche perché in qualche modo l'uomo può metterci meno mano.

Q: Ma avete fatto dei percorsi formativi specifici per applicazioni di queste?

A: Avrei risposto anche a questo. No, siamo un po' indietro su questo, banalmente per questioni di budget, perché poi in qualche modo non si riesce a far sempre tutto. La formazione di livello costa e non sempre si riesce a finanziarla. La mia volontà è quella di iniziare il 2025 con un'azione intensa sul tema dell'intelligenza artificiale per tutto il management team, tutte le persone che sono a riporto del direttore generale e a cascata sui loro primi riporti, perché in qualche modo se i direttori di funzione non hanno competenze e conoscenza sulle potenzialità e anche i rischi di uno scorretto utilizzo, beh, è un problema. Si parlava, c'è stato uno studio che hanno condotto alcuni ricercatori che poi sono stati presentati da Deloitte, che ho partecipato e si raccontava una banalità di particolare, proprio il fatto che in qualche modo noi educhiamo l'intelligenza artificiale quando noi utilizziamo ChatGPT, ne cito una. Se dovessi fare un programma per l'azienda, una comunicazione, gli chiedo di farmi una comunicazione interna in cui comunico agli 843 dipendenti della mia azienda tutte queste serie di informazioni. Lui me la fa, ma io sto passando nell'intelligenza artificiale una serie di dati sensibili dell'azienda che memorizzerà.

È una banalità, dico cose che sapete meglio di me, però vi assicuro che buona parte dei manager d'azienda non lo sanno. Più o meno sanno le potenzialità che possono avere, quindi un sacco di tempo perso, gente che sta delle ore a fare le slide PowerPoint, ancora a mano, quando hai la possibilità di farle in dieci minuti e occuparti di fare altro, o banalmente anche svagarti un attimo che non fa male, perché questa passione nel fare

le slide non l'ho mai capita. Quindi c'è un po' di ignoranza sul tema, non se ne vedono ancora le potenzialità. Dall'altra parte c'è anche molta negligenza. Quindi lo uso in maniera semplice come fosse un facilitatore. Sì, lo è, ma occhio che ci sono dei rischi, e più si sviluppa e più i rischi aumentano. Quindi queste sono fondamentalmente le basi, ovvero non sono un esperto in materia ovviamente perché se fosse anche questo sarei un critico e non lo posso permettere, però in qualche modo vogliamo creare un piano di informazione che ci consenta a chi ha delle responsabilità importanti in azienda di avere contezza delle dei rischi, prima di tutto, e delle potenzialità. Perché ancora secondo me, poi ditemi anche voi come la vedete, però è ancora un tema molto largamente dibattuto, ma a livello aziendale, in Italia, non ha preso ancora così piede. Io penso che lo prenderà per forza, perché poi in qualche modo si è applicato correttamente di far risparmiare dei gran soldi, seppur con gli investimenti iniziali, e quindi rischia poi di dover rincorrere il trend, un po' come la sostenibilità. È bene occuparsene prima che questo diventi mandatorio. Per citare nuovamente Deloitte, loro stanno sviluppando internamente un sistema di GPT, non so come l'hanno chiamato, ma è un studio interno. Ovviamente a livello di consulenza devi processare una serie di informazioni molto più alte di quelle di un'azienda, perché comunque hai business differenti da dover seguire, quindi ti aiuta ancora di più. come la nostra seguita è più limitato, però in qualche modo dobbiamo affacciarci prima che diventi un trend.

Io o ho lavorato anche in alte realtà o comunque come tutti noi HR siamo sempre molto interconnessi l'uno all'altro, quindi ti do anche un overview di quelli che sono le altre aziende. Posso dirti facilmente che all'80 %o in Italia l'intelligenza artificiale in HR si è applicata alla selezione. È nella prima fase della selezione, quindi veramente lo screening. Ti dico anche per fortuna, perché secondo me ancora non si è arrivati a implementare sistemi che siano in grado di fare una valutazione sulle persone. Poi aggiungiamo un'altra cosa che in qualche modo, come dicevo prima, l'intelligenza artificiale è educata da noi, quindi ci vorrà anche del tempo. Dopo la pandemia si è riscoperto positivamente il fatto che prima di scegliere la professionista devi sceglierti la persona. Questo l'intelligenza artificiale non può fare. E questo non lo dico io in realtà, lo dice il fondatore di Reverse, che è una società di Head Huntig, che è la prima società italiana più digitalizzata in assoluto, quindi sono dati questi, quindi gestisce totalmente i processi in maniera digitale. Può, non sempre, può dipendere dai livelli, però ha un'utilità artificiale molto molto alta. Non è un amico, è lui stesso che ha presentato un suo libro qui in azienda e alla domanda che gli era stata fatta risponde "Ma io sono il primo a dire che ad oggi è più importante in un mercato così volatile, incerto, imprevedibile, viviamo in un cosiddetto momento VUCA, in cui dovete scegliere la persona e poi il professionista, quasi a tutti i livelli,

perché in qualche modo la persona non la cambi".

È finita l'epoca in cui ci si diceva, sposiamo il progetto, l'azienda è la tua seconda casa. No, non funziona più. Si può più sentire questa cosa. Siamo una grande famiglia. No, scappa. Il lavoro è il lavoro, la famiglia è la famiglia. A me da attore di lavoro non mi interessa e non mi devo occupare di educare i dipendenti. È una cosa malata, con toni forti, ma mi devo occupare di formare professionista, quello sì. Soprattutto con le nuove generazioni. I giovanissimi, che stanno uscendo adesso dall'università, sanno bene quali sono i loro valori, che cosa vogliono dal mercato del lavoro e questa concezione di lavoro come sconda famiglia non si sposa per niente con quelli che sono i nuovi trend, anche se molti colleghi HR non l'hanno capito. C'è un altro termine sbagliato, una red flag, come si usa a dire oggi, è quelli che si reputano aziendalisti. Cosa vuol dire? Io sono un aziendalista, ma tu sei un collaboratore dell'azienda. In qualche modo ti stai già dicendo che tu appartieni a qualcosa, ma che qualcuno ti dica che non l'hai fatto.

Quindi chi ha questo tipo di bisogno di dover sempre riaffermare un'affezione particolare al proprio ambiente di lavoro, capite bene che è stucchevole e quindi vi deve creare allarme. Poi io la sto estremizzando, ci vuole sempre equilibrio nelle valutazioni. Nella valutazione della persona, reciprocamente, perché voi anche quando fate un colloquio dovete in qualche modo, sto dilagando però vi do delle informazioni, scegliere la persona che avete di fronte. Perché se l'azienda ha scelto di dare ad Andrea la responsabilità di selezionare le persone da assumere, evidentemente Andrea rappresenta la cultura dell'azienda. Non sono matti tendenzialmente, quindi se metto qualcuno a rappresentare il Politecnico è perché il Politecnico si fida di quella persona e di quello che dice, le scelte che fa, e probabilmente perché è un buon front dell'azienda. Poi c'è anche la questione delle competenze, nel senso che i saperi tecnici diventano sempre più a rischio di obsolescenza se tu affidi una funzione, anche una semplice task ad una persona che si mette in gioco a capacità di imparare velocemente, costantemente, nuove competenze, quindi ha delle competenze soft a supporto di competenze hard, ha ancora da sviluppare questa carta vincente.

Q: Volevo un attimo tornare indietro, visto che abbiamo ancora qualche minuto, perché noi con questa ricerca, oltre a vedere lo stato dell'arte delle soluzioni applicate dalle grandi aziende italiane, parliami di oggettificazione delle decisioni, come citava lei in precedenza. Ha già introdotto alcuni KPI ma magari aveva altro da aggiungere su questo aspetto, come per esempio quali sono i principali KPI che vedete che questa soluzione sta impattando o che vi aspettate che impatterà o addirittura quelli su cui vi aspettavate che questa soluzione avrebbe impattato ma che non sta ancora rispondendo nel modo desiderato.

A: Allora, sulla selezione ti rispondo che l'impatto è positivo in termini di tempi, ma le soluzioni non sono ancora così affinate finché siano veramente di supporto. Non esiste provider che possa consentire al recruiter di non fare più quel pezzo di lavoro, perché comunque è troppo diciamo, è troppo eterogenea la scelta in base alla persona, in base al ruolo, in base a come la persona fa il curriculum, a cosa inserisce. Quindi le valutazioni che l'intelligenza deve fare nello screenare un profilo sono talmente tante che non riesce a farle in maniera corretta. Scegliere le altre persone è uno dei lavori, non perché io lo faccia, ma è uno dei lavori più difficili che ci sia. Non c'è un metodo scientifico. L'essere umano è imprevedibile per sua natura. Quindi abbiamo ancora tanti, tanti step da superare. Sicuramente ci supporta, però siamo ancora in una fase in cui l'essere umano deve supportare l'intelligenza artificiale, quindi in qualche modo è un lavoro a quattro mani. Non vuol dire che non ci sia utile, vuol dire che talvolta ci va bene e ci ha tolto del lavoro, tante altre volte bisogna supervisionare che la scelta che ha fatto è corretta. E su questo siamo ancora indietro, non ci sono ancora dei sistemi così avanzati. Da una parte direi per fortuna, perché spesso a volte è capitato di vedere profili scartati, che poi erano i profili che abbiamo assunto.

C'è un tema, io non ho le competenze di capire il perché, sono molto franco, non è il mio lavoro, però questo è un dato di fatto. Sugli altri strumenti che vi citavo prima siamo all'inizio, quindi a questa domanda ti risponderei più magari a febbraio 2025, che inizierà il secondo kick-off, e speriamo di migliorare quello fatto in quest'anno e consuntivare i risultati dell'anno precedente. Per adesso diciamo che ti rispondo come ti ho risposto prima, quindi ci sono luce d'ombra, il grande rischio è sempre quello della formazione, cioè se non è la base, se non si fa della formazione sull'argomento, rimarremo al punto di partenza, a meno che poi non ci venga imposto dall'alto. Quindi sono tutte tematiche che in qualche modo bisogna approfondire prima a livello formativo per poi fare gli investimenti e introdurle in azienda, perché se non lo conosci non puoi neanche capire se è qualcosa che ti è utile o meno investire. Io quando ho presentato il sistema di ATS con l'IAI al direttore generale qualche anno fa mi ha guardato e mi ha detto che dovevo spendere 14 mila euro in più all'anno, per una roba che mi dice quanto è al fine meno a noi. Vabbè dai su, fai due telefonate in più e lo capisci.

Questo è l'approccio, non l'ha detto, non voglio essere classista, una persona che aveva una scolarizzazione medio-bassa, ma una persona che ha esperienze e una scolarizzazione molto alta. È proprio un argomento nuovo e ripeto l'essere umano alla novità la affronta sempre con grande discriminazione, anche questo un dato psicologico, che ci piaccia o no. Poi ovvio, sei scarsamente scolarizzato e meno sei avvezzo alla novità, perché il tuo cervello non è abituato a elaborare pensiero. Più studi e più in qualche modo ti fai delle domande

e più cerchi di trovare delle soluzioni. Infatti, vi do un dato, ma lo faccio interattivamente per raggiungere di dettaglio. Uno strumento che volevamo utilizzare, sempre digitale, è lo strumento di supporto psicologico a tutti i nostri dipendenti. Addirittura, ci sono delle piattaforme che utilizzano l'intelligenza artificiale per fare questo. Io penso sono ancora un po' restio. Ma perché? Perché di fatto l'OMS ci dice che il 18 ‰o della popolazione 18-30 si ammala di ansia e depressione o di disturbi di personalità dovuti anche a un'alta scolarizzazione. Ma che cosa c'entra? C'entra? Avete mai visto un paradosso, un termine forte, uno scemo che si fa domande? Quindi in qualche modo l'ansia è un modo per alzare la sicurezza con sé stessi, no? Poni sempre più conflitti con te stesso perché ti credi le aspettative in più con te stesso che in qualche modo vuoi anticipare. Anticipando ti aumenti il livello di ansia interiore che in realtà c'è sempre e è giusto che ci sia. Quindi più in qualche modo esplori il mondo e più capisci che sei molto più debole di quello che pensi e quindi più vulnerabile. Sono tematiche che penso che tutti coloro che hanno sviluppato l'azienda debbano comprendere. Il tema formativo che faremo è questo qui, capire l'impatto che troppo le patologie psicologiche, che viviamo dopo la pandemia ancora di più, hanno sulle organizzazioni. Noi siamo di fatto un microcosmo perché abbiamo migliaia di dipendenti, quindi siamo una città e quindi dobbiamo chi amministra la città deve occuparsi anche di problemi sociali come questi, degli interessi poi dell'azienda che impattano sul business anche questo.

B.2. Medtronic

Q: Per iniziare volevamo chiedere se ci potesse presentare le varie tecnologie di intelligenza artificiale che usate a supporto dei processi HR nella vostra azienda.

A: Sì, allora noi utilizziamo un assistente virtuale che c'è nella nostra intranet dedicata al mondo HR, noi abbiamo un portale global che si chiama HR Portal e lì abbiamo un assistente virtuale che si chiama SAM che sta per Service and More e che praticamente aiuta gli utenti a ricercare tutta una serie con informazioni per loro assolutamente utili e anche a rispondere ad eventuali domande o dubbi in ambito HR. Sempre però sui processi o strumenti diciamo così, global, quindi non è sicuramente customizzato sulla realtà di country. Se poi ecco, o l'assistente virtuale non è in grado appunto di rispondere alla domanda, o se il dipendente non è soddisfatto, ecco, allora questo assistente virtuale è in grado anche di aprire un ticket direttamente con il nostro centro servizi, che è basato a Praga, ma riportando tutta la richiesta, diciamo lo scambio ancora informazioni, senza che il dipendente debba riscrivere praticamente tutto e quindi passa la palla a questo centro servizi che prende in carico il ticket e poi cerca di evaderlo. Raccoglie le informazioni e cerca di evaderlo. Poi, sempre questo assistente virtuale che si chiama Sam può anche non solo aprire un ticket con il centro servizi, ma anche trasferire tutto questo scambio di informazioni nella richiesta ad una chat una live chat sempre con il centro servizi, per cui la richiesta viene presa direttamente in carico da un agente, da un collega che è presente appunto a Praga e poi chatta live con il dipendente che ha il dubbio, che ha la domanda. Quindi questo sistema virtuale è presente nel nostro portale HR.

Poi abbiamo nel nostro gestionale, che si chiama Workday, abbiamo anche lì una chat box digitale che aiuta i dipendenti ricercare una serie di informazioni all'interno di questo gestionale, dove ci sono tutte le informazioni di se stessi, ma anche di altri colleghi, l'organigramma e quant'altro. Può essere anche questo nostro gestionale in alcuni paesi utilizzato anche per gestire le presenze e quindi se ci sono dei dubbi sulla gestione delle presenze o sulle ferie, un numero di giorni di ferie eccetera, questa chat box ecco digitale è in grado di ricercare l'informazione e di darla al dipendente o di dare praticamente il percorso dove poter trovare all'interno del gestionale appunto le informazioni che cerca. Quindi questo è quello che abbiamo in ambito più, diciamo, operativi.

E poi abbiamo, in ambito formazione, abbiamo una piattaforma che si chiama SkillLab, che praticamente il dipendente entra dentro questa piattaforma, che è un po' l'Amazon, diciamo così, della formazione. Si arricchisce costantemente di contenuti di varie forme. che possono essere Ted Talks, podcast, articoli dall'Harvard Business Review, pillole for-

mative eccetera. Il dipendente entra là dentro, si profila, e quindi su tutta una serie di caratteristiche soft indica un proprio rating, può anche chiedere al manager di fare la valutazione sulle competenze soft e in base a quelle che poi decide di voler sviluppare, la piattaforma propone proattivamente tutta una serie di contenuti formativi con una certa regolarità. Diciamo che è una formazione molto particolare, perché poi indipendente dalla facoltà di farlo, di non farlo, di leggere gli articoli, di non leggerli e di utilizzare questi contenuti formativi, in qualsiasi momento, quindi anche durante il weekend, la sera; quindi, è un tipo di formazione molto agile e molto flessibile che non richiede poi la presenza direttamente in aula, ma è una formula forse più fruibile, anche più immediata, più veloce.

Adesso siamo riusciti anche a collegare questo assistente virtuale di cui vi parlavo prima, quello che si chiama SAM, anche alla piattaforma SkillLab. Per cui se appunto il dipendente ha una serie di domande su alcuni programmi formativi o chiede cosa posso fare per migliorare una certa competenza soft, allora questo assistente virtuale nel nostro portale HR è in grado anche di suggerire quali sono i contenuti formativi più adatti su SkillLab. Questo in ambito formazione.

E poi in ambito invece di selezione, noi utilizziamo anche l'intenza artificiale attraverso una piattaforma che si chiama Paradox, che non so se conoscete Paradox, ma è in grado di schedulare una serie di interviste tra il candidato e il manager. Stiamo lanciando una chat box per fare la prima screening anche ai candidati, per evitare che ci sia una persona fisica che faccia il primo screening, ma una chat box che fa tutta una serie di domande legate chiaramente al profilo e che quindi possa scremare una grande quantità di curricula e di candidature che noi riceviamo.

Poi in generale abbiamo sviluppato un MedtronicGPT per cui è customizzato, cioè customizzato nel senso riferito alla nostra realtà, per cui anche tutti i temi di privacy rimangono tra di noi, nel nostro mondo, e devo dire che funziona molto bene, non solo per, diciamo così, gli faccio una domanda e lui mi dà una serie di risposte, ma come fa anche il normale ChatGPT, sintetizza, crea presentazioni, fa le minute, insomma, ecco, proprio a 360 gradi. E poi, e poi niente, poi sì, però ci sono ecco le normali applicazioni, credo, in intelligenza artificiale, però legati al, come si dice, ai tool di Office, di Microsoft, come in Teams, che riescono, diciamo così, fare già la sintesi di alcune riunioni, tradurre in automatico anche alcuni documenti in diverse lingue e così via. Questo è quello che noi abbiamo.

Q: Se posso chiederlo, in riferimento al primo chatbot di cui parlava, SAM, il fatto che sia usato a livello gruppo e che mandi la richiesta in un altro paese,

vuol dire anche che si occupa della traduzione?

A: Si, può supportare una moltitudine di lingue. Non tutte, però in Europa tutte quelle principali che noi abbiamo. Quindi dall'italiano all'inglese, al francese, tedesco, spagnolo. Per cui è d'aiuto da quel punto di vista lì.

Q: Spostiamoci sul tema KPI, volevamo chiedervi come misurate l'impatto di queste tecnologie attraverso dei KPI e come essi sono variati da quando utilizzate le tecnologie rispetto a prima dell'avvento dell'intelligenza artificiale. Se avete qualche KPI di processo, quindi non KPI specifici sull'utilizzo dello strumento, ma ad esempio sulla talent acquisition, se è diminuito il time to hire.

A: Certo. C'è un team centrale che mappa tutti questi aspetti. Io in questo momento non ho i dati numerici, se vi interessano questi. Però di sicuro, come hai detto tu, il time-to-fill sicuramente si è ridotto. Nel caso dell'assistente virtuale, si sono ridotte notevolmente anche le telefonate, le aperture, il numero di mail, diciamo, che l'HR riceve e quindi abbiamo avuto un'ottimizzazione da questo punto di vista. Abbiamo notato anche una riduzione dei tempi per andare a ricercare determinate informazioni e quindi un'ottimizzazione del tempo a nostra disposizione. Per esempio, sull'assistente virtuale e chiaramente abbiamo ridotto il tempo anche per la ricerca dell'informazione di due minuti per ogni ricerca. Quindi invece di andare a cercare e a navigare nel portale finché non trovo l'informazione, lo chiedo al SAM e quindi ho un risparmio, questo l'hanno quantificato, in due minuti per ogni ricerca.

Q: In ultimo, per chiudere, volevamo chiedervi come valutate l'esperienza con queste nuove tecnologie, se pensate che ci sia un miglioramento o ancora non siano arrivate a un livello tale di avanzamento per cui si può vedere un grande effetto positivo? Magari sono solamente neutre perché sono ancora in via di sviluppo? Qual è il vostro pensiero?

A: Allora, noi adesso a livello corporate, HR sta investendo tantissimo nell'intelligenza artificiale. proprio per cercare di liberare tempo e risorse da dedicare a attività a valore aggiunto. Quindi l'obiettivo è utilizzarlo soprattutto sugli aspetti più operativi e più transazionali, quindi più di sistema. Io credo che gli aspetti positivi ci siano, è una questione prevalentemente di adoption. Nel senso che non c'è ancora molta diffidenza nei confronti di questi strumenti, ignoranza anche, cioè incapacità di usarli nella loro massima potenzialità. Ma non parlo solo di HR, parlo in generale e quindi dovrebbe essere fatto un grosso investimento proprio per cercare di capire qual è il livello di conoscenza dell'utilizzo di questi strumenti per poter colmare il gap. Perché io credo che una volta colmato il

gap, questi strumenti ti aiutano tantissimo. Ti fanno risparmiare un sacco di tempo, ti danno una mole di dati che poi devi essere anche in grado di leggere, di analizzare e di misurare. Quindi io credo che le potenzialità ci siano tantissime. Oggi purtroppo l'impatto di queste nuove tecnologie è abbastanza limitato per questi due fattori ostacolanti. Prima la diffidenza che c'è, non tanto nelle nuove, nei giovanissimi diciamo così, ma quelli che hanno qualche capello bianco in più, e soprattutto nell'incapacità proprio di utilizzarli alla massima nelle loro massime potenzialità. Ecco, quello sì. Quindi credo che debba essere fatto veramente un forte investimento in termini di informazione. Noi lo stiamo facendo, abbiamo appena adesso fatto una survey a livello global nel mondo HR per capire se li utilizziamo questi strumenti oppure no, qual è il nostro livello di conoscenza e di competenza proprio per almeno nel nostro mondo, andare a capire dove sono le lacune e come poterle colmare. La consapevolezza c'è che bisogna sicuramente fare qualcosa in questo senso, indubbiamente.

Q: Direi che è molto interessante questa cosa della formazione dedicata proprio all'HR, è un aspetto molto interessante perché anche noi dalle nostre ricerche è emerso che a livello organizzazione il dipartimento HR è uno dei dipartimenti che utilizza maggiormente l'intelligenza artificiale generativa; quindi, questo aspetto è una conferma anche di quello che emergeva e un ulteriore passo in avanti.

B.3.   Sace

Q: Per quanto riguarda le tecnologie basate su AI, ci potrebbe rifare un panorama su cosa utilizzate nella vostra azienda?

A: Allora, noi utilizziamo da un punto di vista diciamo come strumenti di base, noi siamo stati una delle aziende fast mover, nell'adozione di Copilot, quindi il punto di intelligenza artificiale generativa di Microsoft. Copilot però è chiaramente un tool che stiamo utilizzando sotto due dimensioni, una orizzontale che vuol dire che tutti hanno Copilot e tutti lo utilizzano per farsi aiutare la sua attività a basso valore aggiunto. PowerPoint, Excel, Word, traduzioni, riepiloghi di e-mail, riepiloghi di riunioni, eccetera, eccetera. Su questo aspetto ogni struttura sta identificando degli case study rispetto ai quali utilizzare Copilot per liberare tempo e attività a basso valore aggiunto e poi per utilizzarlo per attività ad alto valore aggiunto, per il well-being, per investire sulle skills o per fare git-back, che è un po' il nostro modello. E in questo chiaramente c'è un livello progressivo di utilizzo di co-pilot che sta, insomma, crescendo. Le persone sempre di più individuano case study dove la tecnologia, l'intelligenza artificiale generativa, crea un valore. Con tutti i riflessi che potete immaginare in temi poi di riallocazione delle persone, reskilling, upskilling, eccetera. Noi abbiamo questo modello che è fast adoption, fast reskilling, fast redeployment, cioè abbiamo deciso di adottare velocemente l'intelligenza artificiale questo però comporta che tu velocemente devi muovere le persone dalle skills in low demand verso le skills in high demand e job in low demand verso job in high demand poi la dimensione due di copilot sono i verticali. I verticali di copilot che cosa sono? Da un lato sono copilot applicate ai processi di business e noi lo stiamo facendo su processi core del business assicurativo, l'underwriting, risk analysis piuttosto che claims dove stiamo facendo delle analisi verticali sempre su alcuni case studies con relativa formazione e stiamo avendo risultati eccezionali, alcuni case study passano da 3 ore a 30 minuti quindi potete capire insomma qual è l'impatto anche su scala nel momento in cui prendi questi case study e li fai diventare operative standard. E di nuovo l'impatto qui è chiaramente su skills e job del futuro. Poi abbiamo altre due co-pilot verticali che sono uno, quello che ha permesso di sviluppare l'HR, il chatbot. Noi oggi abbiamo un chatbot che si chiama SAM che di fatto è l'interfaccia dei dipendenti per tutte quelle che sono ad oggi le attività di tipo informativo. Sostanzialmente avendo avuto in pasto contratti, norme, policy, processi, etc., ti risponde, ti dà informazioni su tutto quello che ti riguarda, anche termini retributivi, compensation, etc. E poi la fase 2 che stiamo implementando adesso, che sarà operativa dal gennaio, ha anche la capacità di fare transazioni al sistema. come fare, diciamo, su comandi scritti con linguaggio naturale, la possibilità di fare azioni su

sistemi, sulle piattaforme di welfare, piuttosto che sul gestionale HR. Quindi, non solo dimmi quante ferie ho, ma caricami due settimane di ferie al sistema. Un esempio pratico. L'anno prossimo stiamo cercando di capire invece l'evoluzione di questo su tutta la parte di Talent. Quindi capire se questo chatbot può essere anche l'interfaccia sulla parte di Talent. Poi ci sono altri sviluppi verticali, per esempio che il business sta sviluppando lato cliente, customer care, eccetera.

Poi noi abbiamo sviluppato il GPS sulla parte di skill based organization, dove il GPS e l'intelligenza artificiale non è generativa, nel senso che in realtà è più un algoritmo, che partendo dai dati che tu gli dai, quelli che sono di destinazione, lui ti sviluppa un algoritmo per dirti se oggi sei qua in termini skills, dove puoi arrivare, quanto tempo, che skills devi sviluppare, quali sono i skill profile più vicini a te quindi ti guida la carriera in una logica skill based attingendo a tutti quelli che sono i dati che sono stati caricati sul sistema, quindi sia lo skill catalog, sia gli stati, sia tutti i dati poi di possesso delle skills personali. Quindi questo GPS riesce a guidare sia lato employee le scelte di carriera, quindi fare scelte data-driven sostanzialmente, sia lato azienda, permette all'azienda di fare scelte data-driven di right people in right place. Perché tu puoi interrogare il GPS e dire chi è la persona che ha il profilo più vicino a questo skillset di cui ho bisogno e ti dice pure queste persone su quale skillset si siedono e provengono e quindi ti può dare anche un senso di urgenza sulla loro necessità di essere allocati in profili diversi perché se io e te abbiamo più o meno stesso skill profile, ma tu stai in un profilo e high demandi, probabilmente è meglio che l'azienda sposti me, che tanto tra sei mesi sono un problema, perché devo comunque andare a fare altro. Quindi questo GPS lo fa in real time, utilizzando i dati che sono alimentati quotidianamente sulla piattaforma. Nell'ambito dei processi HR, quindi oltre al chatbot, oltre al GPS, oggi dei gesti artificiali non lo siamo. All'interno sempre del Career Framework per periodicamente individuare quelle che sono le emerging skills sul mercato. quindi non è tanto in termini di processo ma intanto di aggiornamento di quelle che poi sono le skill emergenti che guidano i programmi di upskilling e reskilling e poi lo utilizziamo anche nella skill based compensation per pesare le skills ai fini della definizione delle scelte di compensation abbiamo implementato questo modello unico al mondo per cui oltre alla job evaluation noi facciamo la skills evaluation e quindi a parità di job all'interno di una fascia di benchmark che, come sapete, va dal primo quartile al terzo quartile, dove ti posizionano a punto di vista di compensation, parlo di base salary, lo faccio in funzione di quanto è ricco il tuo profilo di skills, soprattutto a punto di vista di skills emergenti e skills del futuro.

Questo è il driver importante per sostanzialmente incentivare le persone a investire sulle skills. Soprattutto in un modello di carriera che non è più verticale ma orizzontale, che

altrimenti diventa debole, no? Perché la carriera verticale non c'è più che investire sulle skills, ma alla fine non si capisce perché lo devo fare. Invece più tu investi sulle skills più ti si moltiplica ovviamente l'opportunità di muoverti all'interno dell'organizzazione ma è chiaro che se tu investi poi qualcuno te lo deve riconoscere dal punto di vista di compensation, anche perché se non lo riconosce l'azienda lo riconoscerà prima o poi qualche altra azienda sul mercato. Quindi di fatto non è un automatismo, però sono ulteriori data point che migliorano la qualità delle decisioni dell'azienda quando decide chi premiare e perché. Quindi questo è un po' il quadro a grandi linee.

Q: Grazie mille, è super interessante. Volevamo fare una domanda un po' più specifica. Avete qualche soluzione di intelligenza artificiale applicata al tema di *Well-Being*? Anche solamente un'idea? State sviluppando qualcosa o è un tema non ancora approfondito?

A: No, no, abbiamo un piano che lanceremo nel 2025, se volete vi faccio vedere qualcosa. Io utilizzo l'intelligenza artificiale sulla parte di well-being. C'è la well-being Academy, dove viene utilizzata la GenAI in maniera personalizzata per guidarti, un po' come le piattaforme di learning, di cui non vi ho detto, ma anche quelle sono AI-driven. Noi abbiamo sia Coursera che LinkedIn Learning che sono due piattaforme AI-driven, nel senso che poi tu in base alle skills che devi sviluppare e in base a come navighi le piattaforme, l'algoritmo ti restituisce soluzioni personalizzate rispetto ai tuoi piani di sviluppo. E' un po' questa, well-being Academy funziona come queste piattaforme. Quindi sono piattaforme di learning personalizzate perché Ai-drinven.

Poi c'è l'health navigator che funziona sostanzialmente come il gps soltanto che applicato alla salute sostanzialmente ti indirizza verso lo specialista giusto quindi se il gps della carriera ti indirizza verso diciamo il ruolo giusto comunque lo script profile giusto in base a tua desiderata l'health navigator ti guida rispetto a il professionista che fa parte di questa piattaforma giusto rispetto a quelle che sono le tue esigenze in questo caso di tipo salutistico. Quindi questi sono alcuni dei temi molto innovativi perché sul mercato sappiamo che c'è pochissimo, quasi niente almeno in Italia, in cui chiaramente l'AI viene applicata rispetto a una cura personalizzata, soprattutto in una filosofia preventiva e non curativa, come per esempio adesso sono gran parte i modelli di assicurazione sanitaria, che poi di fatto avranno chiudo operazioni infatti insostenibili dal punto di vista economico, ma dove di fatto anche il check-up stesso prevenzione per modo di dire. Questi invece sono tool che fanno prevenzione in maniera personalizzata e ovviamente hanno alla base tanta tecnologia.

Quindi queste sono alcune delle posizioni che lancieremo nel prossimo anno sulla parte di well-being, sicuramente quello è il futuro, dove però la filosofia è andare in una logica vera di prevenzione, quindi investire soldi affinché le persone non si ammalino, piuttosto che spendere soldi per curare persone che poi sono ammalate, con tutti i temi che oggi ci sono sistema sanitario pubblico di fatto sta scomparendo, tutti vanno sul privato, prezzi alle stelle e quindi i modelli di assicurazione sanitaria finanziariamente sono tutti in perdita, quindi bisogna inventarsi qualcosa di diverso. Hai due strade, o tagli il livello di prestazioni, oppure ti muovi su soluzioni più tecnologiche, cercando di diminuire, diciamo, una parte di curativa o di visite specialistiche, perché fai una prevenzione magari data-driven o high-based. Noi per Filosofia cerchiamo sempre di fare qualcosa che sia innovativo, assumendo certo rischio che poi non funzioni. Proviamo ad aprire anche una strada, perché poi noi ripensiamo che nel giro di cinque anni tutte le aziende devono andare lì. Insieme al nostro partner pensiamo di poter essere quelli che, insomma, aprono la strada, anche in tema di mental well-being, di physical well-being.

Q: Certo. Il secondo tema sul quale ci stiamo concentrando è quello della oggettivizzazione della misurazione dei processi HR, in particolare tramite la definizione di alcuni KPI, poiché sappiamo che in generale tanti processi HR sono difficilmente valutabili o comunque non hanno l'abitudine a essere valutati in maniera oggettiva. Volevamo chiedervi voi se misurate alcuni KPI e soprattutto relativamente a queste soluzioni di intelligenza artificiale che avete implementato e come sono cambiati, per cui se avete ritrovato dei benefici, se invece ci sono stati dei problemi, delle criticità. Per cui vorremmo sapere anche una misurazione di queste implementazioni e un feedback su come stanno andando.

A: Partiamo dal GPS, i KPI sono chiari e anche molto incoraggianti, nel senso che noi sostanzialmente stiamo misurando adesso due KPI fondamentali. e come attraverso questo modello stiamo creando un internal talent marketplace che sostanzialmente ci riduce i costi di hiring e onboarding. Noi in nove mesi abbiamo risparmiato 4 milioni e mezzo, nel senso che abbiamo coperto vacanze attraverso investimenti di reskilling, spostando quindi persone da job in low demand in job in high demand, che senza questo modello saremmo stati costretti, così facevamo fino all'anno scorso, a coprirli attraverso processi di recruiting e con i relativi costi di onboarding e il tempo necessario per rendere queste persone operative. Quindi questo dato al 30 settembre, 4 milioni e mezzo, ovviamente un dato che poi vada a aumentare perché noi abbiamo veramente minimizzato gli investimenti di hiring soltanto a quegli skillset che non siamo in grado di costruirci internamente nel breve termine. Quindi questo modello ti permette di focalizzarti sullo sviluppo delle

competenze invece che sull'acquisto e questo chiaramente in termini di business case è molto è facilmente misurabile, economicamente misurabile. Il secondo KPI è quello del Skill Gap Closure, cioè definite le Emerging Skills attese dall'organizzazione quanta parte dello Skill Gap Closure tu hai chiuso nel corso dell'anno. Noi qui abbiamo TPI sulle core skills, sulle emerging skills, sulle soft skills e siamo un track e quindi oggi siamo in grado di misurare il ritorno dell'investimento di tutte le iniziative che facciamo di upskilling e reskilling in ogni anno si ha le ore di formazione. Ma quale è il tuo investimento in termini di skill gap closure? Che è poi quello che ti permette di andare a coprire ruoli che un anno fa non potevi coprire e per i quali avresti dovuto andare all'esterno e selezionare sul mercato. Quindi questo sicuramente ha una misurazione in termini di efficientemente riduzione dei costi, come dicevo, di hiring e di onboarding, ma soprattutto ti dà la misura di quanto la tua workforce sia costantemente future proof. perché misura effettivamente la chiusura dello skill gap e quindi è un valore enorme da un punto di vista economico. Questo è il motivo per cui skill based organization è un vantaggio competitivo di business. Il terzo elemento è la produttività. Noi abbiamo fatto quest'anno 30 %o in più di produttività. Adesso io non mi sento di dire che è tutta legata a questo perché poi abbiamo fatto una serie di anche modifiche organizzative secondo me e anche culturali che hanno un po' facilitato. Però siamo in linea con quelli che sono i migliori casi di implementazione di modelli di skill based in termini di incremento di produttività. Sulla parte di chatbot gli elementi sono sostanzialmente due. Uno è la riduzione dei costi della struttura HR. Chiaramente noi stiamo spostando persone che facevano attività di core HR su altre attività ad alto valore aggiunto, quindi su quel perimetro di nuovo stiamo riducendo il numero di risorse e quindi il costo della struttura. Quindi sostanzialmente il chatbot costa molto molto molto meno delle risorse che prima facevano questo tipo di attività di sportello piuttosto che di inserimento a sistema di robe per indipendenti e l'altro KPI è l'NPS degli employee quindi sostanzialmente la soddisfazione degli employee è l'utilizzare una seamless experience utilizzando il tool digitale colleghi fisici quindi io utilizzo il tool digitale per tutte le robe transattive, informative eccetera, utilizzo i miei colleghi fisici per tutte le robe che sono più legate a o aspetti più di empatia, di socialità, di problematiche che richiedono quindi, fatemi dire, competenze umane oppure legate a temi di sviluppo, di carriera eccetera, su quali il chatbot. almeno per il momento, non è ancora pronto. Quindi il modello Human Plus Machine deve funzionare un po' come funziona oggi nel mondo consumer, per garantire al nostro consumatore, che in realtà è il nostro collega, al nostro dipendente, la migliore esperienza possibile. Quindi l'NPS è sicuramente l'indicatore migliore.

Q: Grazie mille. Sarebbe interessante anche sapere se questa innovazione è guidata da voi internamente e quindi siete voi l'azienda produttrice di queste tecnologie o magari collaborate con altre aziende esternamente.

A: No, la tecnologia in gran parte Microsoft. Copilot è Microsoft. È Copilot, verticale o orizzontale, è Microsoft. GPS è stato sviluppato da una società esterna, quindi noi non siamo un'azienda che fa sviluppo di tecnologia, ma il problema oggi non c'è un tema di sviluppo di tecnologia, il vero tema per noi è come massimizzare l'impatto della tecnologia sul business aumentando le competenze delle persone. Quindi non è il nostro mestiere fare tecnologia. ma non è un problema trovare la tecnologia. Il tema della nostra sfida è come utilizzarla per massimizzare i risultati senza creare disruption. Perché se tu utilizzi solo tecnologia ma non prepari le persone a farlo non riesci ad averne i benefici perché crea un livello di disruption tale per cui e ne conosco diverse aziende anche grandi, importanti e prestigiosi dove l'adoption dell'intelligenza artificiale sta tra il 2 e il 3 per cento non abbiamo il 100 per cento tutti lo usano e tutti lo usano e quindi sono più produttivi creano. Più valore, quindi chiaramente questo è il beneficio. Non basta mettere lì il sistema, c'è Copilot, vai. Molte aziende, Copilot, Vivensite, tutti Asset Tools sono lì dormienti, perché nessuno utilizza. Perché se le persone non capiscono qual è il beneficio per me, fatto il training, ti saluto. e quindi molti stanno... non è un caso che Microsoft, non so quanti, centinaia di migliaia di clienti ha, noi siamo un best case perché siamo uno dei pochissimi, non l'unico che ha il 100 %o di adoption, ma perché ha trovato la chiave per ingaggiare i dipendenti, cioè di utilizzare i tool per liberare il tempo delle persone e restituirglielo sostanzialmente che poi è là. Noi abbiamo la settimana di quattro giorni, mi prendo il day off per andare a una comunità a fare volontariato. Prima ci devo andare al fine settimana. La batteria energetica, la ricarico, e quando torno mi restituisci il valore, questa è la scommessa. È chiaro che senza tecnologia fai fatica, no? La tecnologia è un po' di miglioramento delle abitudini lavorative che spesso sono abbastanza improduttive, tipo riunioni inutili e tutta questa roba qua, che noi monitoriamo con il VivenSite, con il tool di Microsoft, per cui anche lì i dati ti dicono stai facendo troppe riunioni in cui c'è troppa gente, non si decide niente, quindi tu elimini questa roba qui. Tutta roba che libera tempo, ha zero costo per l'azienda, che è roba improduttiva e questo tempo è tuo, mettilo a vantaggio tuo e dell'azienda, quindi super win win. Quando non è win win vinciamo solo la mia esperienza insegna che si fa più fatica.

Q: Certo, certo, chiaramente. Visto che siamo sul tema, com'è stata l'accoglienza dal punto di vista dei dipendenti? Avete dovuto fare qualcosa di particolare, tipo re-skilling o formazione per raggiungere il cento per cento? Immagino che ci sia stato dietro parecchio lavoro.

A: Abbiamo fatto due cose, innanzitutto un progetto più ampio, ma nel quale questo è stato inserito, di change management. Cerchiamo di spiegare il tool e mi stai facendo una prova, mi sei partito di nuovo da freedom e responsibility e produttività e benessere. Sì, perché alla fine vi pensate che non è altro che un tool che ti dà dei dati e migliora la produttività e benessere. No, quindi se non ti spiego il why. Quindi il progetto di change management è stato fatto passo passo per spiegare perché dobbiamo utilizzare questi tool e qual era il beneficio win-win per tutti, e poi accompagnato da un training specifico, che è come si utilizza il tool, e poi attraverso la creazione di community, che costantemente creano, tengono l'engagement alto, ma soprattutto mettono a fattor comune, per cui utilizziamo un altro tool di Microsoft che si chiama Viva Engage, che è una sorta di piazza, simil Facebook, aziendale, dove all'interno c'è una serie di community in cui si condividono. Oggi Copilot fa questo su Excel. Di fatto diventa condivisione ma anche collective learning e permette alle persone di progredire. In sostanza è il teacher che ti viene a dire, perché poi in azienda c'è sempre un po' smanettone che scopre una cosa, però se lo mette sulla piazza, su BipEngage, poi ci sono altri che seguono eccetera. Non è ti faccio il treno e mi sotturle e buona fortuna, ma è un costante con degli ambassador, chiaramente che abbiamo individuato, che ci sono appassionati, che tengono alto il livello di attenzione e di engagement, ma soprattutto garantiscono la crescita delle competenze sull'utilizzo di intelligenza artificiale collettiva. Perché altrimenti tu il rischio che hai chi fa 150 case study, chi non ce la fa continua a far lavorare come prima e non lo usa. Quindi garantire che ci sia una base minima che fanno tutti poi se uno ne fa duecento va bene però almeno tutti ne dobbiamo fare anche che un'altro almeno venti deve fare poi arriverà a venticinque perché qualcuno gli spiegherà quelli più base. Allora adesso proviamo a fare questo quindi. C'è un tema dove la community diventa un gruppo di espertoni che fanno che vanno su una luna, ma garantisce l'apprendimento collettivo, che poi è quello che crea il più grande valore. Perché se tu hai dieci che fanno tutto, l'azienda poco ne poco lo vede, se tu ne hai mille che oltre a quei dieci ti fanno una base, i miglioramenti sono enormi, su scala sono enormi i miglioramenti.

B.4.   Vodafone

Q: Per iniziare, vi chiederei di presentare quali sono le soluzioni di intelligenza artificiale che utilizzate quotidianamente per i processi. Ho visto che nella survey che avete compilato avete specificato diversi contesti di applicazione, per cui, ecco, lascio a voi la parola per presentarci i diversi aspetti delle soluzioni che utilizzate.

A: Perfetto, allora, mondo recruiting, io ho una piattaforma che è SuccessFactor, su questa piattaforma SuccessFactor è stata diciamo innestata un'ulteriore piattaforma, che ovviamente comunica con SuccessFactor, dove fondamentalmente quello che io posso fare è una sorta di calibration del ruolo che io sto cercando, cioè io ho il mio hiring manager, cioè è il manager che sta ricercando quella vacancies, ovviamente mi ha inviato la job description che è quella che io ho pubblicato perché sia visibile sia ai colleghi interni che ai colleghi esterni, però mi prendo comunque un momento con lui per andare effettivamente definire meglio, al di là della job description, effettivamente quello che sta cercando. Quindi condivido con lui il mio screen e andiamo insieme a identificare quali sono le competenze tecniche che ricerca per quel ruolo. Competenze tecniche che attenzione il sistema già riesce ad uploadare, perché in base al job title vengono già presentate una serie di skills che però vanno vagliate con l'hiring manager. Per cui io gli dico: ne hai qua 85, ne hai qua 15, se tu dovessi darmi un ranking quali sono le prime quattro quelle che veramente sono come dire un must have. Le vai a identificare quindi o cancello quelle in eccesso o le cancello tutte e metto quelle che tu mi dici ma che non venivano automaticamente presentate dalla piattaforma, che ovviamente ragiona su job title con lo stesso nome e quindi ti tira su quello che nella sua memoria sono tipicamente le skills che venivano richieste, quindi o riscriviamo o andiamo per differenza.

Poi ti dico anche di dirmi un profilo o di caricare un curriculum che è esattamente il tuo profilo ideale rispetto a quel ruolo. Può essere anche che tu mi dia un profilo LinkedIn e io vado proprio a digitare il profilo LinkedIn, l'indirizzo LinkedIn di questa persona. Quindi la somma, diciamo, o il connubio tra le competenze che tu specifichi e addirittura Un curriculum che io do in pasto al sistema con il tuo ideale candidato per quel ruolo, mi aiuta poi ad avere rispetto a tutte le candidature che da lì in poi io riceverò, un grading da 1 a 5 di match tra candidato e ovviamente il desiderata dell'hiring manager e quindi quelli saranno quelli che io darò come prioritari. C'è però un ma in tutto questo, che ovviamente ragiona per parole quindi attenzione che poi quello che dobbiamo sempre fare è comunque aprire i profili e vedere se poi quei cinque pallini ipoteticamente sono davvero il risultato di un match perfetto perché basta che ha letto una parola ma poi quella competenza non

ce l'ha davvero, ma semplicemente citata nel suo curriculum, che questo è ingannevole. Quindi è un inizio, è un supporto, però li apriamo, cioè dirti che ciecamente io prendo solo quelli che hanno i cinque pallini ti direi una una bugia, però è sicuramente un'evoluzione, sicuramente un inizio di una ovviamente di un percorso che potrebbe essere veramente molto molto interessante.

Q: Mi stavi dicendo che non vi fidate completamente di quello che vi propone l'intelligenza artificiale. E questo perché vedete che i risultati non sono corretti o perché anche se sono corretti comunque fate un doppio controllo.

A: Allora può essere che ci sia la competenza ma in realtà non è stata poi effettivamente come dire, cioè c'è la parola ma non vuol dire che perché ha trovato quella parola significa che è una competenza che comunque il candidato ha, cioè capita di trovare in qualche modo come dire dei gap tra il perfetto match è quello che poi in realtà, nel momento in cui tu vedi 5 dici "ah ce l'ho fatta, adesso ho trovato già il candidato", quindi ti apri bene ovviamente il profilo, lo analizzi ovviamente nel dettaglio e dici che questo 5 poi in realtà magari è un 3, perché trovi che effettivamente non c'è questo 100 %o, quindi non è tanto una mancanza di fiducia che non è ancora in grado effettivamente di arrivare a quella perfezione.

Q: Certo, si capisce. E queste sono un po' le criticità di questa tecnologia. Invece, guardando i benefici, cosa potrebbero essere?

A: Il beneficio potrebbe essere che effettivamente nel momento in cui il match diventerà più puntuale e più corretto, io invece che leggere ovviamente 80 curricula ne leggerò 10, 15, 20 perché comunque non ci sarà mai il non controllo, ma anche perché banalmente lo chiami ed è chiaro che poi comunque c'è un pezzo che sarà gestito da noi. Chiaro è che ovviamente rendere molto più fittante l'apertura o la scelta di quei pochi CV che apri, ragazzi, cioè time to fill ovviamente che va alle stelle e soprattutto ovviamente lavorazione maggiore di ricerche, no? Se io ci metto meno tempo a coprire vuol dire che posso andare immediatamente su un'altra ricerca. Poi, se posso permettermi, un mondo ideale rispetto a quelli che sono anche tanto l'operatività e la back line che c'è dietro poi, oltre all'identificazione del candidato, ma tutti quelli che sono poi gli step che vanno ovviamente portati avanti da un'azienda per poter poi assumere la risorsa, però qui entriamo più che in un mondo di Artificial Intelligence più in un mondo di automazione, sarebbe bello effettivamente avere che il cambio stato all'interno della piattaforma di recruiting faccia immediatamente scatenare l'invio di mail se ti servono dei documenti l'invio del feedback se l'hiring manager l'ha visto quindi questo Eightfold per esempio in parte a noi lo fa, quindi io posso mandare curricula all'hiring manager attraverso la

piattaforma, il che significa che io non devo scaricarmeli, metterli in un zip, in un folder, zipparli, mandarli, scrivere la mail, ciao x ti mando come dai, ma viaggia tutto sulla piattaforma in un mondo ideale. In un mondo ideale il hiring manager mi fa pollice su se i CB vanno bene, pollice giù se i CB alcuni di questi non vanno bene, quando io poi gli mando la short list di quelli per cui mi ha messo il pollice in su, mi scrive il feedback sempre sulla piattaforma, quindi ho un track record sulla piattaforma di tutto ciò che è avvenuto all'interno di quel processo. Questo la piattaforma lo fa e di nuovo aiuta ovviamente ad avere tutto tracciato e tutto più veloce evitando mail, evitando passaggi inutili. Non siamo ancora best in class in questo ecco.

Q: Invece, la sperimentazione dell'intelligenza artificiale per, diciamo, supportarvi nella scrittura dei profili, l'avete fatta? Ci state pensando? È una cosa che vi può interessare?

A: Allora è una cosa che sicuramente non abbiamo ancora affrontato, diciamo che la stiamo vivendo un po' al contrario ma credo che quell'area sia effettivamente interessante, cioè noi ad oggi stiamo più pensando come data una job description io posso andare a capire chi è il candidato migliore più che alla scrittura delle Job Description. Allora se mi chiedi, secondo me qualcuno va su chat bot e se la sta già facendo scrivere comunque. Effettivamente se tu metti comunque quattro parole chiave, tra stare lì e scrivere tutto e invece in maniera ovviamente intelligente dare le informazioni a voglio dire all'intelligenza artificiale che ti restituisce poi in maniera comunque eloquente e più dettagliata il feedback, sicuramente sono cose che tutti stanno iniziando ad utilizzare. però ad oggi se mi chiedi se in azienda non abbiamo ancora affrontato modi e procedure corrette per utilizzarla a fini aziendali. Cioè io so che probabilmente qualcuno lo fa, se mi chiedi se è prassi e se noi abbiamo stabilito che è corretto, giusto fare, si può fare, come, quando e perimetrare l'utilizzo di, non siamo ancora a questo punto.

Non siamo ancora a questo punto, ma siamo su una strada che velocemente ci sta arrivando, nel senso che noi adesso quello che abbiamo fatto è stato mettere a disposizione di tutti i nostri colleghi un percorso di formazione dedicato che dia le basi a tutti, non solo di come funziona l'intelligenza artificiale, quindi il prompt, come lo devi scrivere, come non lo devi scrivere, ma anche proprio il contorno rispetto all'utilizzo dell'intelligenza artificiale, quindi tutti gli aspetti etici e morali e anche tutti gli aspetti un po' meno romantici della sicurezza dei dati e della gestione del dato. Mettendo a disposizione il percorso abbiamo anche messo a disposizione una versione di Copilot specificatamente creata per Vodafone, quindi grazie alle nostre partnership con Microsoft abbiamo messo a disposizione già da mesi la possibilità di utilizzare Copilot in versione sicura per Vodafone e quindi il fatto che i dati che andiamo ad inserire rimangono solo ed esclusivamente nel

contesto di Vodafone e non vengono poi utilizzati invece per il machine learning diciamo di tutte le altre piattaforme, di tutti gli altri utenti e fruitori della piattaforma, mentre adesso in ottobre di quest'anno stiamo proprio lanciando l'utilizzo del Full Copilot su 68 mila dipendenti. Li stiamo accompagnando, formiamo, gli diamo uno strumento pilota, gli abbiamo dato uno strumento pilota per iniziare a farle familiarizzare e adesso invece la stiamo lanciando proprio lo strumento su tutta la popolazione, sempre con l'utilizzo per business e quindi la sicurezza che i dati che noi andiamo ad inserire rimangono solo ed esclusivamente nel contesto dei dipendenti Vodafone, perché poi anche questo è un tema molto importante che non bisogna sottovalutare, nel senso che noi ci siamo accorti che la gente, soprattutto i giovani, ma non solo i giovani, perché poi ci sono anche persone che hanno una seniority più avanzata che stanno iniziando a giocare con l'intelligenza artificiale, quindi avere una job description, fatta da chat GPT può essere pericoloso, nel senso che a seconda di quello che tu inserisci nel prompt di informazioni business related, l'outcome comunque può essere condiviso e può andare a popolare i risultati di altri colleghi, magari anche competitor, che vanno ad inserire. Quindi per noi era importante delimitare il rischio.

Quello che noi stiamo cercando di fare come accompagnamento dell'intelligenza artificiale, dell'utilizzo dell'intelligenza artificiale è trasversale all'employee experience, quindi adesso vi abbiamo fatto vedere un po' come gestiamo tutto quello che è il primo contatto dei potenziali nuovi assunti e degli assunti, ma non finiamo lì nel senso che la nostra piattaforma, Apple in particolare, ma abbiamo anche altri strumenti che ci accompagnano nel corso dell'employee experience, va avanti e accompagna il dipendente quindi per tutti quelli che stiamo assumendo diciamo da due anni a questa parte tutte le informazioni sul curriculum essendo state caricate in fase di colloquio e assunzione sono già popolate all'interno della piattaforma e quindi quello che abbiamo fatto nel corso degli ultimi anni è stato chiedere invece ai dipendenti un po' più storici di caricare il loro curriculum all'interno di Eightfold per poter fare due cose principalmente. Da un lato mettere a disposizione dei percorsi di formazione dedicati, e qui entriamo in un secondo, e dall'altro dare la possibilità ai nostri colleghi di in inglese noi diciamo own your career, quindi poter essere principali attori di quello che è il percorso di carriera all'interno dell'azienda.

Quindi tutto parte dal caricamento del curriculum automatico nel momento in cui le persone sono entrate a contatto in contatto con l'azienda già da quando avevamo questa piattaforma invece più manuale ma sempre tramite caricamento automatico di curriculum per le persone che invece sono in azienda da un pochettino più di tempo. Caricando questo curriculum la piattaforma in automatico legge quelle che sono le competenze principali delle persone. Ovviamente quando carichi il CV atterri su una schermata che ti

permette di modificare leggermente il contenuto nel senso di sia aggiungere o togliere delle competenze ma anche proprio nella narrativa di quelle che sono le cose principali che tu hai, le attività principali che tu hai svolto in quell'esperienza lavorativa in modo che la piattaforma automaticamente mi mette in evidenza delle nuove competenze. Le competenze per noi si dividono in due aree. La mappatura delle competenze si divide in due aree. Le competenze per ruolo, e quindi quelle che noi ci aspettiamo che le persone abbiano una volta che si siedono su una determinata sedia. e quindi prescindono chi si siede ma sono più relative diciamo alla sedia organizzativa e invece le competenze personali quindi tutte quelle che sono le esperienze che noi abbiamo maturato nella nostra vita nelle nostre vite lavorative precedenti che ci permettono di poter fare poter agire quel ruolo in un modo un pochettino diverso. Faccio un esempio io sono un learning manager in Vodafone e quindi ci si aspetta che io ne sappia di design della formazione, che ci si aspetta che io ne sappia un minimo di custom mercenaries con diversi livelli da 1 a 5, dove 1 vuol dire ne so poco, non ho il contenuto necessario per far sì che quello sia il mio mestiere e 5 è io sono il world expert e partecipo anche a simposi in università su quell'argomento.

Quindi io per essere un learning manager devo saperne di learning, devo saperne di comunicazione, devo saperne di stakeholder management. Io nella mia vita personale, sono magari un appassionata di coding, lo metto all'interno della piattaforma perché io so fare coding, perché ho fatto una vita diversa e quindi lo voglio fare. Magari nelle mie vite precedenti facevo marketing e quindi ho delle competenze di marketing. Magari parlo 18 lingue e quindi posso inserire tutte le lingue che parlo. Nella piattaforma, una volta che carico il mio CV o una volta che il mio CV viene recepito, la piattaforma mi fa anche delle domande e mi chiede quali sono i tuoi interessi, perché io sono learning manager, ne so di coding, ma in realtà la cosa che veramente mi piace fare è conoscere le vendite, quindi come si vende la negoziazione e quindi la piattaforma mi dice che cosa ti piace fare. Mi chiede anche dove mi vedo in futuro e quindi quali sono i percorsi di crescita che più mi interessano. Mi chiede anche dove vorrei lavorare, perché Vodafone comunque è situata su vari paesi e quindi ho la possibilità di inserire anche le città in cui tendenzialmente vorrei poter sviluppare il mio percorso. Una volta che ogni indipendente ha inserito queste informazioni, partono i due processi. Quindi dal punto di vista della carriera, la piattaforma mi mette a disposizione, mi mette in prima vista tutte quelle che sono i job aperti al momento, mesciando le mie competenze, i miei interessi con il job. Quindi quando io entro nella mia bella home page della mia career, vedo il mio ruolo, e poi vedo tutti quelli che sono i ruoli che matchano di più col mio profilo, ma non solo dal punto di vista delle competenze, anche dal punto di vista degli interessi del percorso di carriera delle città. E ogni volta che io entro in un job vedo il bollino del match con le competenze, 20, 30, 40,

50 %o, vedo ovviamente tutte le informazioni inserite quando si crea un job posting, ma l'intelligenza artificiale mi dice anche da dove vengono le persone che prima di me si sono sedute su quella sedia? E ho tutte le aziende.

Quanta seniority hanno avuto le persone che tendenzialmente si sono sedute su quella sedia? E ho tutta la media delle seniority. Che ruoli all'interno dell'organizzazione hanno avuto le persone che si sono sedute su quella sedia? Tutta una serie di informazioni che io non avrei potuto avere leggendo semplicemente il job posting, ma che la piattaforma in automatico mi tira fuori rispetto ai curriculum delle persone che si sono sedute lì prima di me. E questo per me come employee è fondamentale, interessantissimo, perché io riesco a rendermi conto un po' meglio se quella posizione effettivamente ha senso per me. Perché magari ha un job title, ha una descrizione che mi suona, però se poi vedo che io ho un anno di esperienza in Vodafone e le persone in media in quel ruolo ci devono stare tre, quattro anni, già mi dico ma forse sono un po junior questo non mi impedisce di fare apply ovviamente ma rende la mia scelta più razionale più edotta rispetto a quello che è il contesto in cui io mi sto inserendo. Dal punto di vista di formazione è ancora più divertente, perché una volta che io inserisco quello che so fare, quello che mi piace fare, in automatico la piattaforma mi mette in evidenza i contenuti che sono relativi ai miei interessi e al mio percorso di carriera. Quindi questo è un pochino più banale, nel senso che una volta che parliamo tutti la stessa lingua e una volta che siamo tutti sulle stesse competenze, è facile che l'intelligenza artificiale vada sotto, mi lega i titoli, mi lega le descrizioni e mi mette in evidenza. Il percorso che stiamo facendo è di migliorare il machine learning dietro. Quando io scrivo marketing, ad oggi, nei primi mesi, l'intelligenza artificiale mi andava a tirare fuori i contenuti che magari avevano scritto marketing nel titolo. ma marketing in realtà ha una serie di sub skills che sono relative al marketing che l'intelligenza artificiale quando l'abbiamo lanciata non conosceva, tutta la parte relativa al customer, tutta la parte relativa alle analisi, alle data analytics del marketing, tutta la parte relativa alla comunicazione, alla negoziazione, tutta una serie di skills che non hanno magari scritto marketing all'interno della descrizione ma che in realtà possono essere molto importanti per la mia crescita della mia competenza all'interno del mondo marketing.

Quindi diciamo che man mano che le persone utilizzano la piattaforma, la piattaforma impara e quindi riesce a essere più puntuale nel consigliarmi i percorsi. Non è solo un'azione di machine learning, qua devo essere onesta, ma anche proprio un'azione che noi stiamo facendo di mappatura in back-end, quindi diciamo che la stiamo un po' aiutando. Questo perché ad oggi fate conto che Vodafone ha più di 90.000 dipendenti, la %uale di persone che utilizzano la piattaforma ancora è al 20 %o, 25 %o, quindi la stiamo aiutando per

far sì che l'esperienza sia migliore e quindi più persone la utilizzino. Un po' una curva incrementale che man mano che diventiamo più bravi a gestirla, più persone la utilizzano. Una volta che abbiamo pulito l'experience, il machine learning potrà andare da solo, no? E quindi abbiamo questa parte qua. Queste due cose però in realtà lavorano anche insieme nel momento in cui io voglio costruire proprio il mio percorso, quindi in realtà voglio domani diventare l'HR Director di Vodafone, però la posizione di HR Director non è un job aperto e quindi non è che posso applicare così, allora dico va bene, nel frattempo che capiamo un po' nei vari paesi come come lavorano le HR Director, io voglio capire cosa posso fare per arrivare là e quindi posso entrare nella parte di career, posso andare sulla parte di sul job di HR director e dirgli bene, piattaforma mi aiuti a capire rispetto a dove sono io oggi e sono quelle che sono le competenze che ho inserito, cosa manca per poter diventare un HRD, quali sono le competenze su cui devo lavorare per far sì che un domani se ci fosse la possibilità io possa applicare per un ruolo di HR D.

Quindi entro, seleziono ruolo di atterraggio e la piattaforma in automatico, guardando tutti quelli che sono i dati che sono inseriti nella piattaforma, mi dicono guarda tu sei bravissima su ABC, le competenze già ci sono, il ruolo di HR D però richiede anche le competenze EFG. E quindi in automatico mi mette a disposizione i contenuti che ci sono su quelle competenze che a me mancano all'interno della piattaforma. Questa storia è bellissima da raccontare, ovviamente non ci stiamo dicendo che se io allora mi faccio quelle tre competenze in automatico domani sono HR D o non ci stiamo dicendo che siccome c'è un job posting aperto dove io matcho benissimo allora avrò quel ruolo. Ovviamente tutto questo è uno strumento che aiuta un determinato tipo di conversazione, quindi non è assolutamente sostituibile alle conversazioni virtuose che ognuno di noi ha da un lato col proprio capo, dall'altro col proprio business partner di riferimento. Quindi questo è un assunto, è un assioma che non si può toccare e che noi comunque raccontiamo a tutti i nostri colleghi quando raccontiamo questa experience. Quindi l'intelligenza artificiale è uno strumento che ci semplifica la vita, facilitando alcuni processi perché ci mette a disposizione già dei contenuti e ci aiuta rispondendo alle domande, più siamo bravi anche noi a caricare le nostre skill, le nostre competenze, i nostri interessi, a mettere in evidenza le cose che effettivamente ci servono privilegiandole rispetto a tutto il mare magnum di contorno, non è la sostituzione della relazione che ognuno di noi ha all'interno dell'azienda con i vari interlocutori. questo è. Lo diciamo sempre perché è scontato ma fino a un certo punto.

Mi stava venendo in mente, però l'intelligenza artificiale è anche utilizzata, però questo da un po' di tempo secondo me, nell'identificare il sentimento nelle survey, cioè riuscire effettivamente a individuare immediatamente quelle che sono effettivamente le aree e

il sentimento dei dipendenti. Se io penso a tempi in cui dovevi veramente a scaricare dati infiniti, fare analisi eccetera eccetera, anche questo effettivamente è un utilizzo che comunque credo che abbiano ormai tante piattaforme che vanno proprio ad indagare, a fare indagini di sentiment nelle aziende. Noi abbiamo delle survey di clima che facciamo due volte l'anno. Prima era una survey stand alone, adesso le stiamo integrando nella piattaforma di formazione. Quindi fare una survey viene fuori che su quelli che sono i nostri comportamenti, i nostri valori, ci sono magari delle aree di miglioramento in un team piuttosto che in un'area, benissimo, indirizzamento alla piattaforma di formazione che ti legge quelle parole e ti dice guarda questi sono i contenuti. Poi noi abbiamo anche delle partnership importanti con dei vendor d'eccellenza, citiamo Harvard, citiamo l'MIT, citiamo Skillsoft, quindi abbiamo accesso anche a tutto quello che è il loro contenuto e anche gli strumenti che loro utilizzano nelle loro piattaforme di intelligenza artificiale, no? Quindi è un doppio giro. Io ti metto a disposizione un contenuto perché nella mia piattaforma viene fuori che quello può essere un contenuto interessante. Quando poi tu entri nella piattaforma di Harvard, anche Harvard poi lo fa al quadrato, no? Quindi man mano che inizia a cercare all'interno determinati contenuti, anche Harvard te ne suggerisce altri.

Q: Si capisce, chiaramente. E per esempio sempre parlando della questione benefici, hai già detto tanto, se hai qualcos'altro da aggiungere a livello di misurazione, per cui per esempio ci dicevi magari anche banalmente la %uale di utilizzo all'interno dell'azienda di questo strumento o il numero di profili che sono stati mappati all'interno del software per cui con tutte le competenze compilate. Guardate altri aspetti?

A: Allora noi adesso stiamo guardando un po' il consumo. Quindi stiamo andando a vedere non tanto come funziona il processo, almeno io personalmente come obiettivo del mio team, ma cosa sta cambiando come output finale. Quindi quante persone accedono alla piattaforma, quante persone sono active learners, quante ore di formazione ognuno fa e monitoriamo l'andamento nel tempo per cercare di trovare una correlazione fra gli strumenti che lanciamo e quanto cambiano i nostri KPI. Non è tanto come il KPI migliora l'intelligenza artificiale, ma come l'intelligenza artificiale ci aiuta a raggiungere meglio i nostri KPI, confrontato anche con sulle learning hours, quante ore abbiamo fatto, ma poi mi giro verso il mio team e guardo quante ore hanno speso loro a lavorare ai singoli contenuti, perché io mi aspetto che il mio team piano piano cambi anche le sue competenze, quindi non mi faccia più la parte magari più amministrativa, più burocratica, ma usi lo strumento e verifichi l'attendibilità di quelli che sono i risultati dello strumento. È un processo che in aziende grandi è un po' lungo, perché comunque tutta l'analisi dei dati

e anche un po' capire la nostra strategia quando hai un interlocutore, magari un team piccolo è facile, nel momento in cui vai in Vodafone Italia siamo 5 mila, prima in Vodafone Gruppo siamo più di 90 mila. costruire il percorso di crescita ci mette giusto un filino di più, anche solo per capire anche gli interlocutori, avere l'approvazione che stiamo andando tutti nella stessa direzione.

Poi secondo me bisogna capire quale cosa veramente serve, vedi degli impatti, ha migliorato eccetera, è chiaro che un passettino magari successivo potrebbe essere benissimo. Rispetto a tutti quelli che hanno match alto rispetto al job posting per cui poi applicano. Quanti di quelli poi effettivamente hanno poi vinto il job posting? Perché Cece correggimi se sbaglio, tu hai un input come lo dà LinkedIn che ti suggerisce guarda che questa posizione aperta in questo momento ha un buon match con le tue competenze che chiaramente hai inserito, no? Benissimo. Sarebbe bello capire conversion rate, no? Cioè quanti di quelli che hanno poi un buon match effettivamente poi hanno vinto il job posting. Attenzione che però delle volte ci si va effettivamente a sovra. Caricare di analisi che poi bisogna capire se sono veramente utili in quel momento, in quel contesto a quella azienda. A me per esempio in questo momento, infatti ho messo tanti no, ma non perché, ma perché per il contesto che poi magari stiamo vivendo noi, vedere quanti di quelli poi hanno vinto il job posting o meno, non è in questo momento per me prioritario. Quindi siccome comunque i dati vanno analizzati, non è che schiaccio un bottone e hai la risposta perché poi magari si devono parlare perché la piattaforma non è quella che poi ti restituisce la risposta che quei ragazzi hanno poi applicato ed effettivamente ha vinto.

Quindi poi attenzione che i sistemi sono tanti e devi far parlare sistemi diversi che se ha senso si fa, se non ha senso e non è il momento e non è la priorità, se per tirar fuori quel numero devo lavorare, far lavorare il team una settimana, ma è davvero necessario? Il giorno che invece schiacci il bottone e magicamente tu hai un numero, bisogna capire se appunto di nuovo è interessante, è importante, ti cambia la vita, allora lì lavori sull'implementazione ovviamente dei sistemi che si devono parlare, cioè vai a fare delle ulteriori scelte, credo, sui sistemi. Oggi non lo avremmo quello, io ti dovrei dire, cioè dovremmo sapere chi ha il match con il Joe Posting X e Y, io andare a vedere se poi hanno applicato, perché magari tu hai ricevuto un input, ma non necessariamente poi lo hai portato avanti, no? Questa roba qua la devo guardare da un'altra parte, quindi non è poi così semplice come raccontarlo, ecco. Perché adesso secondo me vale quello che stiamo un po' facendo, ma penso che sia quello che stanno facendo tutti, automatizzare il processo esistente. Quindi utilizzo l'intelligenza artificiale per rendere tutto più efficiente, tutto più facile, tutto più veloce.

Ci sarà un momento invece in cui bisognerà fare un po' di disruption, cioè ok ho efficientato al massimo il processo, ho ancora delle attività manuali e quindi fare l'esercizio che dice giustamente vale ma ha senso il processo in questo modo? Magari lo potrei fare in un altro modo più veloce. E lì il tema non è tanto l'implementazione dell'intelligenza artificiale di per sé, ma è tutta la parte soft che c'è dietro di cambio di mentalità delle persone che lavorano attorno a quel determinato processo. Che è un tema che bisogna portarsi dietro sempre e comunque. Sia in aziende, a prescindere dal business, e a prescindere dal processo. Perché quando cambi qualcosa devi far abituare le persone con la loro curva di apprendimento a capire perché lo fanno, come va fatto nel modo nuovo, farle allenare, poi farlo diventare un'abitudine.

B.5. Company 1

Q: Buongiorno, potreste presentare l'approccio della vostra azienda nei confronti dell'implementazione di AI a supporto dei processi HR?

A: Fino ad oggi utilizzavamo dei sistemi esterni per fare, ad esempio, della reportistica avanzata piuttosto che andare a monitorare alcuni effetti però la vera implementazione delle AI è qualcosa che noi stiamo mettendo a terra oggi quindi adesso ci stiamo preparando a livello infrastrutturale sia tecnico che con attiva di change management per cercare di sensibilizzare le persone all'adoption di questi sistemi e poi nel corso del 25 abbiamo una roadmap volta appunto a inserire l'intelligenza artificiale in diversi processi, in diverse fasi del mondo HR. Ti posso dare magari qualche insight rispetto a quali sono i progetti in cui, a breve partiremo, in cui c'è l'AI si infila all'interno di questi progetti. Ti dico già che, ad esempio, ho visto il questionario che si è chiesto di compilare. Noi stiamo adottando un approccio leggermente differente, là si parlava molto appunto di KPI per monitorare come i vari processi sono infatti dell'AI. Noi in questo momento abbiamo dei report dedicati ad ogni pezzettino dei vari processi ma non è un qualche cosa che poi ci dà una %uale piuttosto che un totale che ci dice se stiamo andando meglio o stiamo andando peggio. Sono comunque tutti report gestionali e quindi hanno la possibilità di agire sul singolo individuo o piuttosto sulla singola fattispecie quindi diciamo è un approccio leggermente diverso infatti non so se hai avuto modo di vedere come abbiamo risposto al questionario se vedi sempre no perché è proprio un approccio differente all'utilità della tecnologia. Noi l'AI la stiamo implementando nel processo di recruiting, stiamo facendo una cosa che ormai diciamo che è abbastanza nota quindi inserire l'intelligenza artificiale per fare un match tra le candidature e le job requisition. La cosa interessante in questo caso è che praticamente stiamo utilizzando un sistema che ci permette di allenare l'intelligenza artificiale dando un feedback rispetto al livello di fit che riscontra tra la job requisition e il candidato. Questo è il primo macro-progetto su cui ci stiamo orientando e andremo live a breve nei primi mesi del 25.

Parallelamente, stiamo iniziando a strutturare anche un meccanismo di workforce planning che sia basato anch'esso su AI e quindi ci dà più o meno dei suggerimenti su come andare a calibrare l'attività di pianificazione di nuovi inserimenti e distribuzione dei carichi. Precedentemente a questo però c'è tutta una fase di rimappatura delle persone e delle competenze che hanno le figure in Company Company 1, quindi abbiamo lanciato da luglio fino ad oggi, che in questi giorni stiamo finendo un'attività di mappatura del sistema professionale di Company Company 1, compresa la famiglia professionale che è il macro cappello, poi si divide in dei macro ruoli, ruoli e competenze sociali. Quindi questo qui è

tutta la parte infrastrutturale che stiamo preparando da base dati su cui poi potremmo andare a inserire un'intelligenza artificiale che sulla base di ciò ci dà supporto decisionale. Anche se però non so come lo faremo perché appunto siamo in fase di strutturazione di tutta la base data. Si sente spesso dire che è fondamentale appunto la data quality per portare le AI nel mondo organizzativo, noi siamo esattamente in quella fase, noi stiamo vedendo la qualità del dato, ci stiamo preparando a dare in pasto all'intelligenza artificiale tutti i dati di cui ha bisogno per darci poi un'informazione a noi utile. Quindi lato *Attraction*, appunto, recruiting e la pianificazione dei fabbisogni. E poi abbiamo tutta una serie di casistiche più gestionali. Ad esempio, una cosa su cui ci stiamo facendo in questo momento è analizzare tutti i risultati delle exit surveys. Noi da un anno e mezzo a questa parte abbiamo lanciato un processo di analisi delle exit surveys, quindi il dipendente che si dimette o comunque termina il rapporto di lavoro con Company Company 1 per determinati motivi, automatico. Per finalizzare il processo di termination il dipendente deve compilare lui o l'HR gestionale questa exit survey. Fino a questo momento vedevamo un pochino il trend dei risultati in termini anche un pochino di alto livello per farci un'idea, quindi qual è la motivazione primaria per cui le persone escono, la remunerazione, piuttosto che le possibilità di crescita, piuttosto che non abbiamo un problema di rilocazione geografica. Se avete visto un pochino dove siamo, ovviamente non siamo troppo a Roma, non siamo nelle principali città, stiamo ovviamente per forza di cose in business, se vuoi costruire un aereo non lo puoi fare in centro a Milano, quindi ovviamente uno dei problemi che abbiamo è la situazione geografica dei CD produttivi, quindi prima guardiamo da un punto di vista un pochino più di alto livello, adesso invece vogliamo scendere e creare un modello produttivo da analizzare anche oltre alle risposte che ci danno le persone, ma anche andare a vedere chi è che è effettivamente uscito. Ipoteticamente si può fare un discorso del tipo: abbiamo notato che sulla provincia di Roma, le persone della grada di ingegneria gestionale, che hanno studiato al Politecnico di Milano, dopo due anni se ne vanno. Poi, magari pensiamo c'è bisogno di intervenire su questo aspetto? Sì o no. L'AI ci può dare una mano intatto per identificare i fenomeni, i trend di uscita e poi man mano che mettiamo piccole informazioni magari ci agganciamo le motivazioni di uscita, ci agganciamo il salario rispetto e in questo modo riusciamo a capire se c'è un trend e magari abbiamo anche qualche soluzione in house.

Q: Sono tutte e tre soluzioni molto interessanti. Volevo chiedervi come costruite la scheda delle competenze e poi, una volta che avete questi dati, come li utilizzate per fare sviluppo di carriera o formazione, qual è la prospettiva?

A: Allora, ti rispondo alla prima domanda, quindi siamo sulla parte di raccolta. Noi ovviamente siamo una struttura molto complessa e quindi anche dire magari la famiglia

professionale dell'ingegneria ha questi macro ruoli, questi ruoli, queste competenze per noi è estremamente complicato perché ovviamente un ingegnere meccanico che mette mano su un elicottero piuttosto che su un aereo, piuttosto che su un chip della divisione elettronica ovviamente ha competenze completamente diverse. Quindi abbiamo lanciato nell'ultimo anno una rimappatura di tutto il nostro sistema, si sono creati tutta una serie di referenti, sia a livello divisionale che a livello di famiglia professionale, che si sono parlati e hanno intanto costruito l'albero, diciamo il macroscheletro, di famiglia professionale, macoruolo e ruolo. Poi sui singoli ruoli si è andata a capire, insieme ai principali responsabili delle persone che hanno quel ruolo, capire quali possono essere le competenze principali che una persona deve avere. Abbiamo fatto una lista e abbiamo identificato un livello target che devono raggiungere su ognuno di queste competenze in funzione del loro livello manageriale. Ti faccio un esempio. Se io ho un ruolo che è per esempio il change management, io però non ho persone a diretto riporto quindi ho un tipo di competenze magari dal punto di vista operativo in cui devo raggiungere un punteggio molto alto però ovviamente dal punto di vista gestionale di un team piuttosto che gestionale di attività di altre persone non ce l'ho molto alto viceversa se il mio stesso ruolo ce l'ha una persona che però è un manager o anche un manager di manager ovviamente la parte operativa verrà ridotta in termini di aspettative però si amplierà la parte di gestione del team, gestione delle interlocuzioni con le altre unità piuttosto che gestione delle attività in generale quindi diciamo che costruita la lista, costruita l'aspettativa di quanto ogni persona deve avere adesso lanceremo una campagna di valutazione in cui ogni manager è chiamato a valutare effettivamente la propria risorsa a che punto è di ogni competenza stabilita. Questo si inserisce anche con un'autovalutazione che fa il dipendente sulle proprie capacità. Noi abbiamo un processo di performance review annuale al termine del quale ogni persona è chiamata ad autovalutarsi. Ovviamente il manager in quel caso ha la possibilità di vedere come si è valutata la persona e poi aggiustare o meno l'autovalutazione della persona. Perché ovviamente se una persona ha due persone a riporto è molto semplice, se una persona ha 30 a riporto magari anche avere la vista del dipendente stesso può essere utile. E poi comunque vengono riviste anche in sede di un colloquio gestionale che si fa a termine del processo per dire ci sediamo, secondo te vali 5 su questa competenza, secondo me vali 4, ma perché ci sei dato 5? Quindi diciamo c'è una fase di valutazione delle competenze molto ampia al termine del quale ci porterà ad avere appunto il data set pulito completo e rispondente il più possibile alle esigenze di ogni business dell'azienda. Fatto questo poi per rispondere alla tua domanda i utilizzi sono molteplici il primo che citavo è la parte di pianificazione, si prevede che in futuro serviranno persone, 100 persone in più che hanno quel ruolo, vediamo quali sono le competenze di quel ruolo, vediamo sul mercato che tipo di competenze possiamo trovare e diciamo ok è fattibile, non è fattibile, dobbiamo rical-

ibrare, dobbiamo riproporzionare, magari facciamo 70 con quel ruolo specifico e 30 con un ruolo similare è un pochino questo il gioco di fino che verrà fatto adesso come l'AI entrerà in gioco su questo aspetto però ancora non lo so dire perché tanto dipende da quelle che saranno le esigenze del business dipende da come verranno valutate le persone quindi una volta che avremo lo specchietto complessivo avremo modo di dire ok dobbiamo potenziarci internamente o dobbiamo andare esternamente cioè quindi dobbiamo fare una serie di ragionamenti e poi questa è la parte che guarda verso l'esterno.

Se vuoi vedere la parte che guarda verso l'esterno, tu citavi i piani di successione, no? Quello assolutamente è uno dei progetti su cui andremo a lavorare. L'idea è far sì che alleneremo un modello di Machine Learning in grado di trovare le persone e le posizioni critiche, capire come quelle persone sono arrivate a quel livello e capire se ci sono dei potenziali successori. Eventualmente poi lo step proprio successivo e ultimo a capire se ci sono questi successori, l'AI mi deve suggerire anche cosa gli manca a questi successori per essere ready ad andare a ricoprire quel tipo di posizione. Ovviamente questo lo puoi fare se, solo se, hai uno storico delle competenze della persona e poi a tendere dovremo avere anche uno storico dell'esperienza della persona. Quindi bisogna anche lanciare una fase di compilazione di un cv interaziendale ad hoc per rispondere a questi requisiti, però questo è tutto, come vi ripeto, sempre preparazione dell'infrastruttura dati. Quindi stiamo agendo per step, siamo ancora in una fase, appunto, embrionale, quindi abbiamo molte idee, abbiamo molti potenziali sviluppi, ma poi come effettivamente li metteremo in pratica ma è ancora è presto per dirlo perché dipende anche molto da come verrà poi popolato il dato e le informazioni che ci verranno restituite in seguito alle varie campagne di valutazione piuttosto che di compilazione. Ad esempio ci accorgiamo che abbiamo solo ingegneri che hanno fatto un tipo di percorso, ovviamente è diverso strutturare un modello predittivo su un filone unico su n-mila filoni. L'idea c'è anche di creare, sulla base delle informazioni che abbiamo, un modello di AI che ci suggerisca un percorso di sviluppo ad hoc per la persona, che ovviamente in prima fase verrà fatto solo per quelle posizioni critiche, poi un giorno chissà, magari lo potremmo fare anche su... quasi capillare lo potremmo fare, su tutte le persone che potenzialmente c'è interesse di farle crescere, potremmo farlo sul singolo potenzialmente, però ovviamente è uno step molto avanti nel tempo, forse un anno di lavoro, un anno e mezzo, sicuramente non sono due mesi.

Q: Sicuramente, poi immagino anche le dimensioni dell'azienda non aiutino. Comunque questo è un trend che stiamo vedendo anche conducendo le interviste, principalmente l'AI infatti viene applicata sulla parte di recruitment iniziale e diciamo in maniera simile anche sulla parte di carriera interna comunque facendo il match tra la posizione ed il candidato. E poi sulla parte di

formazione, per cui una volta che vedi cosa manca a quel candidato, in quella certa posizione, allora poi vai a fornire le competenze mancanti. Per cui sì, siamo in linea con i trend del mercato.

A: Sono quelli i trend, anche perché i vari prodotti che si stanno sviluppando sono su quel filone, quindi noi comunque, per quanto poi abbiamo noi la possibilità di giocare e di disegnare, magari qualcosa di specifico per il nostro contesto organizzativo, però il macro trend è comunque un qualcosa che segue l'andamento di mercato, perché ovviamente ti devi andare a cercare di portare almeno al livello del mercato, poi se riesci vai anche oltre, però intanto almeno a quel livello ci devi arrivare, sennò poi rischi di essere poco appetibile. Infatti poi, sempre rispetto alla domanda iniziale, parliamo anche di engagement. Una cosa che stiamo notando è che tante aziende stanno iniziando a monitorare il livello di engagement anche in maniera silente, lasciamo dire, quindi attraverso l'analisi testuale, piuttosto che diciamo tutto ciò che esce dalle canoniche survey. Anche per questo ci stiamo attrezzando, stiamo capendo come farlo, ma ci stiamo attrezzando perché l'obiettivo è creare gli strumenti di sentiment analysis in modo tale che andiamo a intercettare eventuali mal di pancia, eventuali necessità, eventuali criticità in modo appunto silente. Come farlo ancora non lo sappiamo, però l'idea c'è, l'esigenza è abbastanza impellente, è qualcosa di cui l'esigenza si percepisce, anche perché poi c'è da valutare il nostro tipo di contesto, cioè noi non siamo tutti impiegati, che abbiamo l'ufficio in maniera organizzata, questo quanto, noi abbiamo anche una grossa setta che è la popolazione operaia e ovviamente andare a intercettare le esigenze della popolazione non è così semplice, quindi ci dobbiamo andare a trovare alcuni meccanismi che ci permettono di andare a raccogliere in maniera proattiva le esigenze di tutta quella popolazione. Ovviamente alcune le possiamo intercettare attraverso quelli che una volta ti chiamavano i gestori del mondo risorse umane, quindi gli HR business partner, i HR site, noi abbiamo questa doppia declinazione, però trovare poi un meccanismo pseudo-automatico che ci permetta di farlo è assolutamente il nostro obiettivo. Come farlo ancora non lo sappiamo, però. Questo purtroppo non ti so ancora rispondere.

Q: Certo, certo. Ma voi nell'implementazione di queste tecnologie state procedendo internamente o vi appoggiate a società, fornitori oppure aziende di consulenza?

A: Dipende, ad esempio per quanto riguarda il mondo del Recruiting AI stiamo utilizzando un prodotto sviluppato da Workday che è il nostro gestionale principale, è un prodotto di Workday perfettamente integrato quindi noi stiamo solo customizzando un prodotto che è già pronto. Per altre cose invece siamo noi, ad esempio per l'exit, per il monitoraggio dell'exit siamo noi che stiamo scrivendo il modello di analisi e il modello decisionale.

Q: Ok, lasciando un attimo la parte HR, voi come vedete l'utilizzo di AI all'interno dell'azienda in generale? Sicuramente la parte operaia la utilizza un po' meno rispetto a una società di impiegati più classica, però vedete che c'è utilizzo, c'è propensione o più uno scontro, una divisione?

A: Vi dirò che è difficile quello che succede all'interno dell'azienda perché diciamo, le dinamiche aziendali non sono semplici. Company Company 1 ha una divisione, non so se sapete, questa unità che in realtà si occupa di intelligenza artificiale, forse sicuramente se volete, diciamo, conoscere quello che viene fatto in termini di intelligenza artificiale, interfacciarvi con loro può essere una buona cosa. Effettivamente il mondo HR non è così. . . , anzi l'utilizzo anche proprio gestione quotidiana dell'attività. Per esempio per scrivere una mail non è così comune. Il problema che ChatGPT funziona ma noi abbiamo molte restrizioni per il tipo di attività che fa Company Company 1 c'è moltissima attenzione sulla sicurezza. Attualmente, sul progetto che abbiamo di controllo con l'intelligenza artificiale delle risposte che vengono date alle domande dei questionari sull'exit, c'è fatica ad utilizzare pure la tecnologia per queste restrizioni, cioè noi non possiamo utilizzare chatgpt, non possiamo e quindi è anche difficile l'utilizzo della tecnologia.

Q: Un altro trend che abbiamo visto, sempre con riferimento all'intelligenza artificiale generativa è che molte aziende che abbiamo sentito si stanno dotando di un sistema di GenAI come può essere Copilot, ChatGPT, verticale sulla azienda, un sistema chiuso che si alimenta e impara attraverso le informazioni che solo i collaboratori della azienda immettono e quindi dovrebbe essere in qualche modo anche più sicuro dal punto di vista che ci stavate raccontando voi. Su questo avete fatto delle pensate, è in programma?

A: No, su questo il mio dubbio è come fai a garantire la sicurezza del dato se utilizzi i ChatGPT? Quello che si sta cercando di fare è migrare su un cloud proprietario, cioè attualmente diciamo alcune delle cose che abbiamo su HR sono su Cloudera però l'obiettivo è quello di migrare appunto per temi di sicurezza in un cloud interno che è già presente. Lì dovrebbero comunque essere presenti anche modelli di intelligenza artificiale generativa. So che ad esempio la divisione elicotteri ha sviluppato un chatbot utilizzando Llama di Meta e quindi l'obiettivo sarebbe anche per noi sarà cercare di agganciarci a questo tipo di tecnologia. L'obiettivo poi sarà cercare di utilizzare strumenti che sono completamente interni all'azienda e non interfacciarsi con cose esterne perché c'è proprio un problema di sicurezza del dato. Co-pilot in realtà è un tema che si sta valutando. È stata fatta una richiesta esplicita per l'adozione di Copilot e stiamo cercando di capire se si riuscirà appunto perché comunque, con questa grandissima attenzione che abbiamo sulla sicurezza, è comunque difficile far passare una richiesta di questo tipo però c'è una forte richiesta

anche perché Cioè è impensabile per me nel 2024 che non ci si possa interfacciare con strumenti di questo tipo. Cioè la sicurezza non deve diventare comunque un alibi al non possiamo fare nulla. Dobbiamo trovare la modalità di farlo. Però ci vorrà tempo. Noi siamo proprio all'inizio, abbiamo una lista di ottimi propositi, l'attenzione aziendale c'è verso questo tipo di questioni, però ci scontriamo con un passato che e diciamo è comunque difficile da gestire perché comunque tu devi gestire una transizione con un passato dove queste cose non c'erano e dove magari c'è anche una resistenza verso questo. Però spero che veramente alla fine dell'anno prossimo potremmo raccontare un'altra storia. Ci proveremo, noi ci impegneremo.

Poi posso risponderti anche l'ultima cosa che ho visto su questo? Di recente abbiamo condotto dei focus group di analisi proprio perché tra le persone fuori dal mondo del chatbot, direzionandoli a tutta una serie di strumenti innovativi che vorrebbero implementati nelle loro attività quotidiane. E' ovviamente il tema di utilizzare strumenti come appunto Copilot, cioè CPT, diciamo gene AI a più ampio spettro, possibilità di interfacciarsi con un chatbot che e gli aiuta ad orientarsi nel dominio di conoscenza. Queste esigenze molto sentite, con un asterisco però, sono tutte esigenze molto sentite della popolazione impiegata che non è vincolata al luogo fisico di lavoro. Questo perché anche magari una persona che svolge il 99 %o delle sue attività a computer, che però è fondamentale che si interfacci con la realtà operativa fisica in loco e questo quindi vi fa diminuire la necessità, non più su strumenti di AI ma più che altro strumenti magari per provare a rendere più efficace quel processo fisico. Diciamo che noi siamo un pochino divisi, c'è chi è totalmente remotizzabile che vuole assolutamente che questa tecnologia entri nelle proprie attività, chi invece ha anche un minimo di attività vincolata alla sede fisica, intanto si preoccupa di trovare uno escamotage per evitare che questo vincolo persista nel tempo. E' proprio uno switch di interesse e questo si ripercuote anche nel mondo delle risorse umane, perché comunque, come dicevo prima, però i gestori, nella maggior parte dei casi, sono vincolati al sito fisico, perché magari hanno in gestione tantissime persone che non sono remotizzabili per definizione, ma anche impiegati non remotizzabili perché hanno a che fare con gli operai. Quindi alla fine si riduce, cioè stringendo il 50 %o della popolazione aziendale che è vincolata al sito in molti casi e quindi c'è un'attenzione anche del mondo HR nel migliorare la vita sul sito in molti casi piuttosto che trovare lo strumento di AI che poi tanto le persone sono variegate per la loro definizione quindi l'AI per quanto si può aiutare ogni istituzione a sé, l'AI non ti dirà mai come gestire un caso gestionale di litigio tra capo e diretto riporto. Quindi, sicuramente è un decision support. Quello sicuramente nessuno lo mette in discussione. Però ovviamente per la natura in-and-out-of-business, l'esigenze per molte persone sono altre. Il lavoro per questo momento è farvi capire come anche degli

strumenti che, a primo acchito, possano non sembrare rispondenti a necessità invece possono essere comunque un bordo di supporto. Diciamo questo è un cambio di paradigma grandissimo che noi dobbiamo affrontare e questo è nell'HR come in tutte le altre attività del business. Tra l'altro su questo adesso stiamo predisponendo un corso di AI per HR indirizzato alla popolazione appunto HR che dovrebbe svolgersi l'anno prossimo appunto per cercare poi di portare queste cose e un po' anche di cambiare la mentalità su queste tematiche. Cioè è un lavoro difficile insomma.

Q: Questo è molto interessante, sarà un corso per l'HR che ha l'obiettivo anche di far capire all'HR quali sono le opportunità dell'utilizzo dell'intelligenza artificiale?

A: Esatto nel senso è un corso introduttivo di intelligenza artificiale dove ti si fa vedere quali sono appunto le opportunità che puoi avere nelle varie ambiti dell'applicazione dell'intelligenza artificiale. Diciamo lo step successivo è quello che appunto di rendere l'HR agente di cambiamento, però intanto prima bisogna renderli consapevoli su come l'AI può essergli utile nel quotidiano, nelle loro attività, così che questa energia possa essere poi propagata all'esterno. L'obiettivo ultimo è quello, intanto fargli rendere conto di come l'AI può essere utile nelle loro giornate è il primo step, però poi attendere assolutamente quello di essere promotori di questo cambiamento.

B.6.   Company 2

Q: Noi di solito partiamo chiedendo se puoi descriverci le applicazioni abilitate da intelligenza artificiale che utilizzate in ambito HR.

A: Per quanto riguarda L'intelligenza artificiale, ti racconto dal mio punto di osservazione, io lavoro nell'unità di selezione e sviluppo della holding. Lato selezione, l'intelligenza artificiale viene utilizzata per la redazione delle job description, viene utilizzata per lo screening intelligente dei curricula, quindi parliamo della prima fase del processo selettivo. Abbiamo sviluppato con una società esterna un applicativo che ci permette, sulla base di una serie di variabili che il recruiter dà, di tirare fuori candidati che in una graduatoria fittano maggiormente rispetto alla posizione sulla base delle variabili settate dall'HR. Parallelamente a questo stiamo lavorando ad altri strumenti sempre per supportare la fase di screening dei curricula e anche di ricerca intelligente rispetto al nostro database.

Utilizziamo, non è proprio un sistema di intelligenza artificiale, anche se ci sarebbe la possibilità di attivare delle funzionalità, nel senso una piattaforma di un fornitore esterno per raccogliere video interviste dei candidati, quindi fatte non live, ma registrate e poi visionate in maniera sincrona, a cui sarebbe possibile applicare, ancora non l'abbiamo mai fatto, come funzionalità anche già una pre-analisi tramite intelligenza artificiale dell'intervista da parte della piattaforma, una funzionalità che non abbiamo mai utilizzato.

Poi lato selezione ti direi un po' sulla parte dell'employer branding, utilizziamo dei visori che riproducono alcuni nostri impianti che utilizziamo ad esempio nei career day per far assaggiare alle persone quello di cui ci occupiamo, i nostri business, quindi tramite la realtà aumentata e tramite i visori. Gli stessi vengono utilizzati in alcune attività formative, per esempio formazione specifica in ambito sicurezza. Il processo selezione e employer branding, mi sentirei di dirti che non abbiamo altre applicazioni. Utilizziamo nella pubblicazione degli annunci spesso campagne di targettizzazione degli annunci, sono più forse funzionalità di marketing che di digitalizzazione e analizziamo tutta una serie di indicatori per il monitoraggio del processo, rispetto anche alla survey.

Q: Sì, se possiamo anche magari approfondire questo aspetto anche rispetto al cambiamento, se avete visto dei cambiamenti di valori dall'applicazione.

A: Noi per esempio come indicatori abbiamo sicuramente un indicatore che ci dice da dove arrivano i candidati, quindi lo step prima dell'atterraggio al nostro sito perché tutti i canali poi diciamo si appoggiano al nostro sito. Stiamo poi sviluppando, quindi non ti so dire l'effetto, perché stiamo ancora monitorando l'applicazione dello screening dei curriculum al processo di selezione. Oggi noi mappiamo i tempi di selezione dalla data

di candidatura del candidato alla data di assunzione. Anche se vorremmo affinare questo indicatore andando a pescare la data di firma della lettera di assunzione, in modo tale che ci possa dare il tempo effettivo, quindi da quando mi sono candidato a quando ho firmato il contratto. Ad oggi abbiamo invece la data di candidatura e la data di assunzione. Vorremmo in seguito monitorare come con l'utilizzo, l'applicazione sempre più massiva di strumenti di intelligenza artificiale, se questo indicatore che ci dà un tasso medio di durata del processo selettivo è impattato o meno. È al momento un tipo di considerazione che non riesco a farti.

L'altro aspetto che ci piacerebbe monitorare è che noi stiamo sempre più utilizzando intelligenza artificiale per la scrittura delle job description con il vincolo indicazione alla generazione di job description quando più possibile gender free e che vadano a pescare da job simili di competitors le competenze più richieste sul mercato rispetto a quel job title. e sarebbe interessante monitorare anche come noi monitoriamo oggi il tasso di candidatura per genere e per fasce d'età e vedere se con l'utilizzo di job description generate con l'AI abbiamo variazioni demografiche rispetto ai tassi di candidatura per genere e sulle fasce d'età. Ad oggi ci aspettiamo dei miglioramenti su questi aspetti, ma non ti so dare un'indicazione di trend e di impatto concreto su questi aspetti. Sto pensando se ci sono altri indicatori, però questi sono i principali.

Lato sviluppo, sempre in termini di intelligenza artificiale abbiamo utilizzato un avatar nella parte di intervista che facciamo, nel processo di assessment, quindi parliamo di processo di sviluppo. Con assessment intendiamo i processi che vengono fatti di valutazione: per valutare che tipo di competenze hanno le persone, che potenziale hanno rispetto a una crescita interna. In questo processo di valutazione, che prevede diverse prove, quest'anno per la prima volta abbiamo sperimentato l'utilizzo di un avatar durante il processo di assessment che ha somministrato delle domande, ha fatto una stress interview alle persone coinvolte nell'assessment, per raccogliere informazioni sul loro stile decisionale e il modo in cui agiscono all'interno del proprio ruolo lavorativo.

Q: Rivolto a chi era già dipendente?

A: Sì, è un assessment di sviluppo, quindi voglio far crescere una persona, la metto in questo processo valutativo, tiro fuori un profilo di competenze che mi dice: comunicazione media, presa di decisione alta, e sulla base dell'output dell'assessment si costruisce un piano di sviluppo personalizzato. Questo ho un feedback informale da parte dei partecipanti che hanno apprezzato tanto questa modalità, perché spesso incastrare le agende degli assessor, cioè colui che fa la valutazione, con i partecipanti, soprattutto in processi che coinvolgono tante persone, è molto complicato. Invece dare la persona la tranquillità,

anche psicologica, di scegliersi il momento più adatto per sottoporsi a questa intervista, il ritorno che abbiamo avuto è sicuramente positivo. Queste sono un po' le applicazioni principali che mi vengono in mente, principalmente sulle tematiche della selezione, dello sviluppo e della formazione. Non so, se vuoi fammi tu qualche domanda.

Q: Grazie. Per avere magari una panoramica un po' generale anche di cosa state facendo e di dove vi state spostando. Voglio chiedervi un'ultima cosa, avete riscontrato aspetti positivi nell'uso dell'intelligenza artificiale? Avete anche riscontrato aspetti invece negativi o problematiche?

A: In generale grazie al sistema di intelligenza artificiale c'è un grosso risparmio di tempi rispetto a tutta una serie di attività che hanno come output ad esempio generazione di contenuti o la sistematizzazione di contenuti. Io do in pasto l'applicativo che abbiamo di intelligenza artificiale associata al nostro pacchetto Office, gli dico di sistematizzarmi un documento o di tirarmi gli insight da un documento, o di tirarmi gli insight da una riunione, questo è molto efficace e permette un grosso risparmio di tempo. Lato selezione, ad esempio, abbiamo avuto dei feedback contrastanti rispetto alle video interviste. che alcuni candidati ce l'hanno segnalato come fossero un po' asettiche e impersonali, dicendoci che preferivano comunque fare un colloquio vis-à-vis. Però sicuramente il lato selezionatore c'è un grosso risparmio di tempo nella scrittura delle job description, nell'indirizzazione delle competenze core da andare a ricercare, magari nell'analisi dei curricula, quanto questi sono tanti, su sezioni in cui hai centinaia e centinaia di curricula. Il contro è che sullo screening dei curricula, per quanto abbia anche approfondito il tema, penso che necessiti ancora tanto della sensibilità umana, perché c'è sempre un margine d'errore e quindi il rischio di non considerare dei profili buoni. Sulla parte soprattutto delle soft skills, la lettura dei CV è ancora un po' fragile. Perché ci vuole tanto lavoro ancora di intelligenza delle macchine. Un ulteriore aspetto è l'intelligenza artificiale e oggi che ancora un po' tendenzialmente è con bias rispetto al genere maschile, cioè avendo per anni e anni sviluppato dati che mettevano anche nella scrittura principalmente l'uso del maschile o meno risente un po' ancora di questo tema di discriminazione verso il genere femminile. Quindi questo aspetto qui, oltre all'aspetto del margine dell'errore, a mio parere rende ancora non certo l'utilizzo dello strumento dello screening sui curriculum, per quanto noi abbiamo iniziato a utilizzarlo e a sperimentarlo. Il percepito dei candidati è un po' contrastante, i benefici però in termini di tempo su alcune attività sono evidenti.

Q: Quindi penserete comunque di investire ancora risorse?

A: Sì, gli input sono... ripeto, noi abbiamo un sistema di scheming intelligente dei curriculum, ma stiamo lavorando per altre soluzioni da mettere in campo. Stiamo lavorando per

avere soluzioni che ci permettano di avere una candidate experience del candidato molto più rapida. Il one click dita carica il CV, c'è una lettura del CV e c'è un'autocompilazione dei campi. Quindi per snellire la candidate experience e in generale c'è tanto movimento per sempre di più digitalizzare i processi anche rispetto all'analisi degli indicatori, fare anche analisi più predictive o intelligenti che mettono insieme tante variabili. C'è tanto investimento su questo anche da parte nostra. La tendenza, soprattutto lato selezione, è sempre di una maggiore digitalizzazione e automatizzazione degli step.

B.7.   Company 3

Q: Buongiorno, potrebbe presentare l'azienda e come utilizzate soluzioni di AI applicate ai processi HR?

A: Noi siamo una realtà che è nata innovando. Quindi siamo molto attenti al concetto di innovazione, lo siamo tuttora, anche se è cambiato un po' il modo di stare in relazione al cambiamento e all'innovazione, perché 40 anni fa quando siamo partiti eravamo un po' i pirati, oggi siamo la marina, dico sempre citando Steve Jobs. Quindi quando sei in una posizione di leadership il cambiamento è un po' più complesso da gestire perché impatta in maniera diretta sul tuo conto economico e quando perde il leader perde tanto, perché ha tanto da perdere e quindi un punto di share si traduce in una cifra economica di mancati guadagni, di mancati ricavi rilevanti, per cui c'è tanta attenzione a questo in generale. Nel frattempo però non possiamo non innovare, quindi cosa facciamo? Innoviamo ma con grande cautela, con grande cautela e con grande attenzione, questo può essere un po' un refrain che ci accompagna. Tanto più vero quando si parla di intelligenza artificiale, che è sicuramente un tema caldo, centrale nell'agenda di tutti, ma che ci impone di essere molto attenti. Una persona che io stimo moltissimo mi diceva l'altro giorno questa cosa: Guardando come va il mondo, l'America inventa, gli Stati Uniti inventano. la Cina copia e l'Europa regolamenta. E quindi noi siamo comunque attenti alla regolamentazione. Il primo, credo, AI Act è stato generato all'interno dell'Europa. Adesso si attende un altro, credo a breve. un altro pronunciamento, un perfezionamento, insomma, stiamo cercando, si sta cercando a livello internazionale di regolamentare questo strumento perché, e quindi, cosa stiamo facendo noi? Fondamentalmente ci stiamo informando, stiamo studiando, stiamo pensando di strutturarci al nostro interno per capire come gestire al meglio questa, questa nuova sfida, questa avventura, questa opportunità. Ma siamo molto cauti nell'adozione stiamo sperimentando qualcosina comunque anche in ambito in HR non direttamente ma attraverso dei partner quindi la nostra azione si sta sviluppando non in una logica di make or buy ok noi oggi siamo più in una attenzione al mercato per capire cosa di sviluppare internamente delle soluzioni dedicate o verticali su questo mondo proprio per poter farci un'idea anche concretamente attraverso delle piccole azioni che andiamo a sviluppare insieme a partner esterni. Nello specifico cosa abbiamo fatto e che cosa pensiamo di fare? A parte che ormai l'intelligenza artificiale è presente in tante realtà che noi già utilizziamo. Faccio un esempio, LinkedIn sta iniziando a sperimentare l'implementazione dell'intelligenza artificiale all'interno della sua piattaforma, per cui noi banalmente, semplicemente utilizzando LinkedIn, stiamo già utilizzando quella tecnologia. Lo stesso vale per una realtà con cui abbiamo costruito alcuni case, che è Steps

Connect, che utilizza in quel caso l'intelligenza artificiale per rendere più forte e diretta e ingaggiante la relazione con i Job Seeker anche quando non sono in ricerca attiva. Steps Connect è una piattaforma che traduce la job description e utilizza l'intelligenza artificiale per gestire le informazioni chiave. Fa due cose, da un lato supportare il cliente nella generazione di un post su social, per instagram o tendenzialmente facebook, e quindi costruire un post partendo dalle informazioni contenute nella job. Quindi lui legge la job, estrae degli elementi chiave e costruisce un post su Instagram molto molto sintetico, molto accattivante, che mira a catturare l'attenzione dell'utente, pushando il contenuto sulla bacheca dell'utente e invitandolo a cliccare per approfondire. Quindi questo lo fa il sistema utilizzando l'intelligenza artificiale, che viene utilizzata anche nella pianificazione della campagna, cioè nella costruzione. Si costruisce una target persona e poi si va ad incrociare tutta una serie di dati, per cui si va a fare una pianificazione mirata, in funzione delle abitudini di consumo degli utenti, tutto anonimizzato ovviamente. Quindi cosa fa il sistema? Dice che il Target Personas è un giovane tra i 24 e i 26 anni e controller, ok? Quindi diciamo, per affinità in termini tematici di contenuto, il sistema stima che chi si occupa di controllo di gestione ha una laurea in economia, ha un profilo di questo tipo e consuma questo tipo di contenuti, ok? Quindi frequenta questi gruppi, segue queste aziende, incrocia questi dati e individua dei profili che sulla rete e sui social hanno quel tipo di comportamenti.

Q: Ma con profili intende nome e cognome o più come abitudini?

A: Come abitudini, esatto. E quindi costruisce un bacino di utenti che il sistema stima siano interessati a quel tipo di job. Poi compra spazi da meta e, segmentando il target, pusha su quel target lì quel contenuto. Perché lo fa? Perché è un approccio win-win, perché il costo di accesso a questa tipologia di promozione è un costo abbastanza basso per l'azienda, per noi. Perché lo fa ad un costo basso? Perché di fatto si sta promuovendo, cioè Steps Connect ha iniziato ad avere una base di utenti di qualche milione, di un milione e mezzo, quindi il fatto di comunicare all'esterno il suo brand, veicolando una job, che è di un brand importante, come queste Company 3, impatta sulla sua reputazione valorizzandolo e aumentandone la considerazione, perché poi alla fine l'azione che chiede quando pusha sulla bacheca del profilo dell'utente che si ritrova questo post, l'azione che viene richiesta è di cliccare sul post, atterrando su Steps Connect, scriversi al portale per accedere ai dettagli di quell'offerta.

Noi abbiamo l'anno scorso sperimentato questa tecnologia, questa piattaforma, questa scelta rientra nella strategia che ti dicevo prima, cioè noi siamo convinti che i fatti in generale continuano più delle parole, e quindi si impara più facendo che ascoltando, cioè vogliamo farle le cose piccole magari, piccole con dei piccoli carotaggi molto verticali ma

farle, quindi fare l'esperienza per capire davvero cosa funziona, cosa non funziona, cosa può essere interessante per noi. Ecco, questa è una cosa piccola che ci sembrava. Quindi questo è un caso secondo me concreto di utilizzo dell'intelligenza artificiale applicata al mondo HR che noi abbiamo sperimentato attraverso la collaborazione con questo partner, Steps Connect, che utilizza l'intelligenza artificiale in realtà in tre momenti. Il primo momento è quello della costruzione di una post social partendo e estrapolando le informazioni dalla job. Il secondo momento è la pianificazione della campagna, quindi supporta la piattaforma nell'identificare il target segmentando l'audience. Il terzo utilizzo di intelligenza artificiale, che trovo anche questo molto carino, è l'attivazione della possibilità per cui la job viene raccontata da un avatar, io volendo potrei farmi registrare dalla piattaforma SepsConnect, fare un discorso come sto facendo io adesso con te e parlare di qualsiasi cosa, pertanto è fare un discorso abbastanza lungo che abbia un certo numero di parole in cui io posso parlare in maniera così, naturale, anche con delle espressioni di movimenti. La macchina registra tutto, dopodiché prende la job che io ho scritto, quindi che l'utente ha scritto, prende quella job e la fa interpretare all'Avatar. Quindi non devo ridire tutta la job, io scrivo semplice, ho parlato una volta sola, ho registrato una volta sola, poi tu ogni volta metti dentro delle job diverse, puoi fare anche campagne contemporanee e il tuo avatar racconta con la tua voce e con le tue sembianze. Non vogliamo essere così esposti, siamo molto cauti e quindi abbiamo invece scelto una seconda opzione che è quella che l'offerta da SepsConnect che prevede magari che ci possessa una resistenza da parte del cliente su alcune cose e dice se vuoi attivare questa funzione e non vuoi farlo tu uno dei nostri founder non mi ricordo come si chiama adesso Matteo mi pare Matteo presta la sua immagine e quindi c'è il Matteo che racconta agli utenti la job di Company 3 esattamente utilizzando le parole nostre quindi quello che noi abbiamo scritto nella job, con una buona resa devo dire nel senso che è molto fluido il video l'audio insomma funziona bene, si capisce decisamente si capisce che è un avatar.

Q: Posso chiedere un'ultima cosa? Ci sono dei KPI che misurate per valutare appunto l'impatto e il valore che ha questa nuova tecnologia nei vostri processi. Non so se già è un tema che avete approfondito oppure siete ancora in fase di test.

A: Siamo ancora in fase di test e soprattutto in termini quantitativi, non stiamo parlando di un numero di ricerche tale da rendere necessaria un'analisi dei KPI strutturata, perché ci sono pochi dati. Però concettualmente i KPI sono chiari. Sono sia di tipo quantitativo che di tipo qualitativo. Il quantitativo impatta sul time-to-hire fondamentalmente, quindi noi ci aspettiamo in termini di impatto misurabile, ci aspettiamo che l'implementazione di certe tecnologie aiuti per esempio nella fase di ricerca a rendere le ricerche più efficienti,

più efficaci, cioè ci aiutino a individuare in meglio tempo il miglior candidato possibile per quella posizione. Quindi l'altra cosa che poi vai a misurare è il gradimento e quindi la risposta a parte del capo del team nei confronti della performance espressa dalla persona dentro il team, quindi quanto sta lavorando bene e quanto il capo è soddisfatto di quell'inserimento, E quanto è soddisfatta la persona dell'inserimento, ok? Perché magari una cosa a cui noi teniamo tantissimo è essere molto chiari, molto trasparenti nella promessa di valore che facciamo durante le fasi di selezione. Cioè non andiamo mai in ipervendita. Non promettiamo mai robe meravigliose ma diciamo le cose come stanno, mettendo in luce i punti di forza di un'offerta, quello che può tornare come qualcosa di gratificante e quello che invece è più legato alle sfide, alle difficoltà e questo è molto importante ed è molto efficace perché poi le persone quando arrivano si ritrovano in una realtà che è coerente con quello che è stato raccontato, anzi spesso è meglio di quello che magari si poteva percepire dal racconto e quindi ci sono zero alibi, non so come dire, e se invece tu fai una promessa di una roba assurda che poi non è vera arriva la persona ma dopo sei mesi se ne va. Quindi misurare il time to hire, in quanto tempo riesco a chiudere la ricerca, quanto poi nei sei mesi e l'anno successivo il team e il capo è soddisfatto di quell'inserimento e quanto le persone inserite nel mio camera è soddisfatto dell'inserimento. Saranno questi KPI principali per me, per misurare il successo della nostra funzione.

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List of Abbreviations and definitions

Abbreviations

- AGI: General Artificial Intelligence

- AI: Artificial Intelligence

- ATS: Applicant Tracking System

- CV: Curriculum Vitae

- CV: Large Language Model

- GenAI: Generative Artificial Intelligence

- GPT: Generative Pre-trained Transformer

- HR: Human Resources

- HRM: Human Resource Management

- KPI: Key Performance Indicator

- L&D: Learning & Development

- ML: Machine Learning

- NLP: Natural Language Processing

- RO: Research Objective

- RQ: Research Question

- SME: Small and Medium-sized Enterprises

Definitions

- Applicant Tracking System: An Applicant Tracking System is software that streamlines and manages recruitment processes, from job posting to candidate selection.

- Artificial Intelligence: Artificial Intelligence is the field of computer science focused on creating systems that perform tasks that would typically require human intelligence, such as language recognition, visual perception, and logical reasoning.

- Chatbot: A chatbot is an AI application that simulates human conversation, interacting with users via text or voice, commonly used to answer FAQs or assist customers.

- Generative AI: Generative AI is a category of Artificial Intelligence that generates new content, such as text, images, or music, using deep learning models to produce realistic or original outputs.

- Generative Pre-trained Transformer: The Generative Pre-trained Transformer is a deep learning model for NLP, based on Transformer neural networks, capable of generating coherent and contextually relevant text.

- Human Resources: Human Resources is the business function responsible for managing an organization's workforce, including recruitment, training, performance management, and employee welfare.

- Key Performance Indicator: Key Performance Indicators are metrics used to evaluate the success of an activity or business in relation to set goals, essential for performance monitoring.

- Machine Learning: Machine Learning is a branch of AI that enables systems to automatically learn and improve from experience without explicit programming, using algorithms to identify patterns and predict outcomes based on data.

- Natural Language Processing: Natural Language Processing is a field of AI that allows machines to understand, interpret, and generate human language, enhancing human-machine communication.

- Platform: A platform is a digital infrastructure that provides tools, services, and resources to facilitate interaction, collaboration, and access to digital products and services for users and developers.

- Startup: A startup is a temporary, often rapidly growing organization that develops and markets an innovative product or service, seeking a scalable and repeatable business model.

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