

# AI Occupational Exposure, Language Modeling and Personnel Selection: Future Perspectives of Labour Law

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*The authoress examines the evolving labor market due to digitalization and the effects produced by artificial intelligence, with particular attention to the implementation of models that aim at linguistic modeling and with a focus on the introduction of a measurement of occupational exposure (AI Occupational Exposure). In particular, the analysis of the AIOE (AI Occupational Exposure) is interesting, i.e. the measurement of the exposure of each profession to artificial intelligence. The paper also analyses the new methods of company selection with some case studies such as Unilever, and DeepSense. Finally, there are some reflections on the de iure condendo perspectives on the personality and legal responsibility of artificial intelligence and on the increasingly central role of collective bargaining.*

**Keywords:** *Artificial intelligence; ChatGPT; Language modeling; Occupation; Collective bargaining*

## Introduction

### *Problem Location in the Scenario of Digitalization Processes and Eurostat Data*

The labour market is constantly evolving as a result of digitalisation processes and the transitions that are occurring across it that contribute to outlining a sometimes-complex picture of employment. Therefore, trying to understand the ramifications of Artificial Intelligence (AI) on the labour market is equivalent to hitting a “moving target” as AI capabilities continue to evolve<sup>1</sup>.

On the one hand artificial intelligence may reduce employment in some sectors for some professions, on the other hand it may produce new employment and professional profiles with new specific and multidisciplinary skills<sup>2</sup>.

Data Scientists are a prime example of such newly developed central figures; they are experts who use AI methods to analyse and interpret data, neutralising patterns, trends, and insights that are critical to making unbiased and objective business decisions. In fact, this professional role is expected to have multidisciplinary between statistical, analytical, and programming skills.

According to The World Economic Forum in The Future of Jobs Report, “according to estimates from 803 companies interviewed for the report, employers

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<sup>1</sup>Felten, Raj & Seamans (2023); Cfr. ILO (2024) .

<sup>2</sup>On the impact of artificial intelligence read Treu (2024); Scarpetta (2023); Acemoglu, Autor, Hazell & Restepo (2022); OECD (2024).

expect to create 69 million new jobs and eliminate 83 million of the 673 million jobs corresponding to the data set, with a net decrease of 14 million jobs, or 2% of current employment<sup>3</sup>.

In this scenario, the loss of 2% of employment could cause significant changes in the labour market if, on the one hand, opportunities related to new emerging professions will develop, while on the other hand not all workers could benefit and adapt to the new market demands<sup>4</sup>.

An important step forward, at the European and global level, was achieved with the development of machine learning algorithms<sup>5</sup> capable of not only “learning” from large volumes of data using specialised processors but also improving their precision capabilities over time. The estimates of the European Union and the European Court of Auditors predict that the global AI market will grow annually by 15.8% in the period 2024-2030, reaching 739 billion dollars (680 billion euros) in 2030. In contrast, the adoption of AI technologies by businesses and the public sector could lead to significant increases in productivity in the entire value chain (from research to commercialisation) in various economic sectors of the Union and also help solve social problems. This is because AI is an innovative technology and the efficiency of investments in this sector will probably be a key factor in determining the pace of economic growth in the years to come. Several countries around the world have set themselves the strategic goal of becoming leaders in the development and diffusion of AI<sup>6</sup>.

According to research conducted by Eurostat, published in May 2024, in 2023, 8% of companies with more than 10 employees in the European Union have integrated artificial intelligence technologies into their operational frameworks. Denmark (15.2%), Finland (15.1%) and Luxembourg (14.4%) represent the countries with the highest percentage of companies that employ ten or more workers in the field of artificial intelligence technologies. On the contrary, Romania (1.5%), Bulgaria (3.6%), Poland (3.7%) and Hungary (3.7%), occupy the lowest positions in this ranking, while Italy's percentage is 5%. According to Eurostat, larger companies have shown a greater propensity to use artificial intelligence technologies than small and medium-sized enterprises (SMEs). In 2023, only 6.4% of small businesses and 13% of medium-sized businesses used AI, while a higher percentage, 30.4%, is represented by large businesses.

According to the European Statistical Office, the gap could be associated with various reasons, including the difficulties that arise when trying to adopt AI technologies in organisations. Another reason is that companies, with significant economies of scale, make more profits, and consequently, have a greater propensity

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<sup>3</sup>The World Economic Forum, (2023).

<sup>4</sup>For the applications and problems of artificial intelligence, please refer to Kaplan (2016); Brynjolfsson, Li & Raymond (2023). For an Italian analysis read Ponte (2024); Butera & De Michelis (2024); Biasi (2024); Romeo (2024); Faleri (2024).

<sup>5</sup>On the self-learning machine learning system, using the mass of information obtained from the universe of *big data* cfr. Mateescu & Nguyen (2019); Lee, Kusbit, Metsky &, Dabbish (2015); Lo Faro, (2022); Jarota (2023); Silberg & Manyika (2019).

<sup>6</sup>Read The White House (2024); White House (2023); Babina, Fedyk, He & Hodson, (2024); Autor & Dorn (2013).

and availability of economic resources to implement advanced technologies and artificial intelligence systems.

In terms of specific AI technologies used by companies, the year 2023 saw the predominance of workflow automation or decision assistance (specifically, automation of robotic software processes using AI), used by 3% of companies. This was followed by written language analysis (text mining, at 2.9%) and machine learning (deep learning, at 2.6%).

Eurostat data highlights, however, that despite the growing attention to AI, its integration at an organisational level is not uniform and there are differences in applications.

The differences observed between different countries and between company sizes highlight some critical issues, including geographical disparities that are evident especially between Northern Europe and their Eastern and Southern counterparts with regard to digitalisation, technological infrastructures and innovation capacity. Furthermore, economically advanced countries seem to have better access to the essential resources for AI adoption, while those with less developed economies face significant financial and technical obstacles. The same situation occurs for SMEs (small and medium-sized enterprises), which, unlike large companies, face more difficulties in adopting superior technologies aimed at automation. This framework calls for greater support, more tax incentives and greater access to specialised skills to reduce the technological gap. Eurostat highlights that the complexity of AI implementation, the associated costs and the lack of economies of scale are key factors that impede the adoption of AI technologies in SMEs. This confirms the theory that although AI has substantial potential for transforming business practices, it requires a lot of investment that goes beyond financial assessments to include the improvement of skills and the advancement of infrastructure.

Overall, the study shows that there is a large gap in AI adoption in industrial Europe, with more developed companies and nations at the helm. It follows, therefore, that for AI to be a true catalyst for widespread transformation, it will be important to reduce disparities and promote policies that help SMEs and underdeveloped nations overcome economic and technical barriers.

## **Findings/Results**

### *Exposure Language Modeling and AI Occupational Exposure*

The topic of employment related to the implementation of models that aim at artificial intelligence also pertains to the issue related to linguistic modeling<sup>7</sup>, that is, an AI and machine learning technique that allows a model to learn and generate texts in natural language; an example is ChatGPT<sup>8</sup>, widely used by young people

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<sup>7</sup>Cfr. Eloundou, Manning, Mishkin & Rock (2023).

<sup>8</sup>The program, introduced by OpenAI in late 2022, has attracted considerable attention and sparked considerable debate. On this point, see D'Elia (2023).

and adults, and which represents a system consisting of a chat bot, that is, an AI chat that has been developed to simulate a conversation with a human person.

The scientific literature on the point highlights that linguistic models are having a strong impact on working professions and there are many studies on the subject. In particular, a study by Felten<sup>9</sup> has attracted deep attention regarding the introduction of a measurement of occupational exposure (AI Occupational Exposure), which outlines the professions, sectors and geographical areas most susceptible to the influences of AI and to the advances of AI in language mediation (generative AI).

The results indicate that the most vulnerable occupations include telemarketers and a series of post-secondary teachers, including English language and literature instructors, foreign languages and literature, as well as history teachers, while the sectors most exposed to the advances of Artificial Intelligence are legal, financial and security services.

In detail, the analysis of the AIOE (AI Occupational Exposure) is interesting, i.e. the measure of the exposure of each profession to artificial intelligence. This term is used in a neutral context because it indicates that the impact on professions of AI can involve both the replacement of human work and the improvement of their potential and skills.

The AIOE measure was constructed by establishing connections between ten distinct AI applications (such as strategic gaming, image recognition, language modeling, and speech recognition, among others) and fifty-two human skills (e.g., listening comprehension, speaking, and inductive reasoning) through a crowdsourced matrix that assesses the degree of correlation between each AI application and these human skills<sup>10</sup>.

The AI applications dataset comes from the Electronic Frontier Foundation (EFF), while the human skills data comes from the O\*NET database, developed by the U.S. Department of Labour. This study found both the strong influence that AI has on some professions and the exposure of many occupations to AI language modeling advances. Specifically, 20 (twenty) professions were identified for each sector.

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<sup>9</sup>Felten, Raj & Seamans (2018); Felten, Raj & Seamans (2021).

<sup>10</sup>On the topic of skills, read Lane, Williams & Broecke (2023); Acemolu & Johnson (2023).

**Table 1.** *Top 20 Occupations Exposed to AI, Original and with Language Modeling Adjustment*

Rank	Top 20 Occupations from Original AIOE	Top 20 Occupations after Language Modeling Adjustment
1	Genetic Counselors	Telemarketers
2	Financial Examiners	English Language and Literature Teachers, Postsecondary
3	Actuaries	Foreign Language and Literature Teachers, Postsecondary
4	Purchasing Agents, Except Wholesale, Retail, and Farm Products	History Teachers, Postsecondary
5	Budget Analysts	Law Teachers, Postsecondary
6	Judges, Magistrate Judges, and Magistrates	Philosophy and Religion Teachers, Postsecondary
7	Procurement Clerks	Sociology Teachers, Postsecondary
8	Accountants and Auditors	Political Science Teachers, Postsecondary
9	Mathematicians	Criminal Justice and Law Enforcement Teachers, Postsecondary
10	Judicial Law Clerks	Sociologists
11	Education Administrators, Postsecondary	Social Work Teachers, Postsecondary
12	Clinical, Counseling, and School Psychologists	Psychology Teachers, Postsecondary
13	Financial Managers	Communications Teachers, Postsecondary
14	Compensation, Benefits, and Job Analysis Specialists	Political Scientists
15	Credit Authorizers, Checkers, and Clerks	Area, Ethnic, and Cultural Studies Teachers, Postsecondary
16	History Teachers, Postsecondary	Arbitrators, Mediators, and Conciliators
17	Geographers	Judges, Magistrate Judges, and Magistrates
18	Epidemiologists	Geography Teachers, Postsecondary
19	Management Analysts	Library Science Teachers, Postsecondary
20	Arbitrators, Mediators, and Conciliators	Clinical, Counseling, and School Psychologists

Source: Felten, E. W., Raj, M. & R. Seamans (2023), How will Language Modelers like ChatGPT Affect Occupations and Industries? 6 March 2023, p. 15.

### *Automating Tasks*

In the same vein, other studies<sup>11</sup> have highlighted how digital technologies can automate so-called “routine tasks,” that is, tasks in which a specific set of standardised rules and practices are followed. These tasks are codified in computer software and performed by machines, such as robots to assemble a car and e-mails to send messages. In contrast, “non-routine tasks” have historically been difficult to program because the explicit steps to perform these tasks are often not formally described; these are tasks that require tacit knowledge<sup>12</sup>, intuition, integrating the expertise of workers.

Paradoxically, even if we cannot formally express non-routine tasks in an algorithm, many of these tasks are easy for humans to perform.

Goos, Manning, & Salomons<sup>13</sup>, in their analysis, demonstrate that routine tasks fall into the category of medium-wage occupations (e.g., machine operators, office clerks), while “non” routine tasks (e.g., waiting tables in a restaurant, cleaning a room, diagnosing diseases, or managing a team) fall into the low-wage (e.g., waiter, cleaner) and high-wage occupations (e.g., health professionals, managers)<sup>14</sup>.

Old technologies have been able to automate only repetitive and routine tasks, while artificial intelligence intervenes by automating all non-repetitive professions and with a high or low salary. In literature, Webb<sup>15</sup> conducted research in which he used algorithms derived from natural language processing that exploit the overlap between the text containing the description of the different occupations and the text

<sup>11</sup>Brian, D'Asaro, Garcez & Raffinetti (2022).

<sup>12</sup>Autor (2024).

<sup>13</sup>Goos, Manning & Salomons (2014).

<sup>14</sup>On this point, please read The White House (2022).

<sup>15</sup>Webb (2020).

of the patents<sup>16</sup>. This overlap is done to understand which tasks Artificial Intelligence can automate, emphasising the exposure of that task to technology.

For example, in the text containing the main characteristics of the doctor's job, if it is assumed that there is the task "diagnose the patient's condition", the NLP (Natural Language Processing) algorithm will extract the noun and the verb, therefore "diagnose" and "condition" and will compare them with the various existing patents; at the end of the comparison, it is verified which technological initiatives can replace the doctor's activity in question. Webb, with this approach, focuses especially on two technologies specifically: software and robots. Software has a lower percentage of exposure in replacing workers with medium-high education, to the detriment of middle-category professionals. Its exposure increases in the male gender and decreases in women, reflecting the fact that women tend to almost always cover complex roles of interpersonal interaction. The robot, on the other hand, increases its extension in individuals with no or little education and in men under 30.

In addition to software and robots, Webb also focuses on AI exposure in relation to job demand, resulting in the most exposed occupations including clinical laboratory technicians, chemical engineers, opticians and power plant operators, as well as low-skilled jobs such as manufacturing and specifically control and inspection.

The increase in the adoption of AI in medium-high level jobs in the long term can lead to professional deskilling, making the skills, experience and knowledge of the worker less relevant in the working world.

Companies, through the correct use of artificial intelligence, can avoid the spread of this situation. In fact, workers must not be left alone by the organisation during the transitions generated by change and technological development, but must be supported by continuous training<sup>17</sup> and development of the staff<sup>18</sup>. Only through the correct implementation of AI will it be possible to have greater profits and, at the same time, greater job satisfaction.

The main purpose of artificial technologies is, therefore, to support human beings in daily activities, improving efficiency and work production, which is why humans must not feel replaced by the machine, but must see in it a colleague capable of helping them to best perform the specific task required.

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<sup>16</sup>NLP (acronym for Natural Language Processing) or natural language processing refers to Artificial Intelligence algorithms capable of analyzing, representing and therefore understanding natural language. The purposes can vary from understanding content, to translation, to autonomously producing text starting from data or documents provided as input.

<sup>17</sup>Cfr. ILO (2021),.

<sup>18</sup>Advanced robots equipped with intelligent sensors are able to not only operate in proximity to workers but also interact directly with them. On the relationship between robots and humans, read EUROFOUND (2024).

## Discussion

### *What are the Prospects of using Artificial Intelligence in Personnel Selection Processes?*

As a result of changes in the labour market, selection methods are also changing. Today, in fact, more and more companies are adopting Artificial Intelligence systems to recruit staff. HrExecutive, one of the main American human resources portals, claims that after a survey of 225 American managers who are experts in personnel research, it emerges that 60% of large American companies already use advanced AI (Artificial Intelligence) systems to manage human resources. The percentage is expected to grow to 82% by 2026. The Globe Newswire network of Los Angeles estimates that the business generated this year by Artificial Intelligence applications for the personnel management sector in companies will be 4 billion dollars. This figure is estimated to increase by 35% in the next five years, reaching 17 billion dollars.

According to a Report in the Journal of Society, Economics and Management, human resources (HR) selectors are increasingly filling strategic positions, leaving administrative activities under the guidance of artificial intelligence systems.

The most relevant case of collaboration between recruiters and industry 4.0 is that of the robot Vera, created in 2018 by a Russian start-up, Strafor, which had a resounding success when the IKEA company identified it for the selection of personnel. IKEA is a multinational that receives thousands of CVs a day. The advanced technology that makes up the Vera robot represents the only solution capable of performing a rapid and efficient screening of candidates.

Vera Robot, in fact, is capable of conducting more than 1500 interviews in a day and it takes only 8 minutes to conduct an interview with candidates, and then identify those selected for the next step, where they will be evaluated by human selectors.

Randstad Italia, which is part of the Dutch multinational, has also recently implemented an AI-based recruiting management system. This is a software that controls all the phases of the selection process, from the creation of the job description and job profile, to the application, to the publication of the adverts, up to the hiring of the candidate. In addition, the company will soon introduce advanced chatbots with the aim of conducting more in-depth interviews as well as enhancing data sharing between colleagues<sup>19</sup>.

The Artificial Intelligence framework used by Randstad Italia is able to evaluate up to 29,000 CVs per day, subsequently transmitting the profiles of interest to the organisation, based on the respective job offers. This particular selection method radically transforms the methodology of the entire recruitment and selection paradigm of personnel<sup>20</sup>.

Many organisations extend this technique further, delegating to automatic selection processes, including the first preliminary contact with potential candidates, using chatbots (software designed to imitate human conversation) or emails aimed at

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<sup>19</sup>On this point, please read Randstad (2023b).

<sup>20</sup>Randstad (2023a).

arranging a face-to-face meeting with the recruiter. The entire process minimises human involvement until the actual interview. Among the various personnel selection methods, video selection is also worth considering, a form of video interview that has achieved considerable success: Companies looking for personnel often ask candidates to send a video response to a predetermined series of questions as an initial filtering mechanism. Then, after having carried out the initial screening of CVs, if the company is interested in the candidate, a face-to-face interview will be requested. This methodology, considered very innovative, has been implemented by several large organisations, such as Blablacar, Leroy Merlin, Crédit Agricole, Sephora and Cartier. Companies prefer this method because it allows them to both speed up the selection decision-making processes and to offer candidates the opportunity to reflect extensively on their answers without leaving their residence<sup>21</sup>, and with a subsequent reduction in costs and times.

#### *Case Studies: Unilever and DeepSense*

The use of automated processes in personnel selection offers numerous advantages. The most relevant for the company is economic: investments in the automated recruitment sector are expected to exceed 200 billion dollars, with a figure destined to increase, since by 2030 Artificial Intelligence is expected to contribute 15.7 trillion dollars to the global economy, a part of which will come specifically from applications in the job recruitment sector<sup>22</sup>.

Another advantage is that traditional recruitment models are based on manual analysis of CVs, which requires a lot of time and resources, making recruiters feel overwhelmed by the heavy workload. Furthermore, the traditional selection process operates more slowly which can also lead to a loss of talented candidates who may elude the attention of a traditional company and end up hired by a competitor that was much speedier.

It is necessary, however, to also consider the numerous applications that companies receive every day. CV screening requires a considerable amount of time and energy, winding up by setting aside applications that could have been valid for the company.

In this context, Artificial Intelligence represents a significant solution because it allows you to evaluate candidates effectively and reduce continuous work requests. Kelli Dragovich, a personnel selector at Hired, claims that the early stages of recruitment are the longest and most tiring, especially when you have to contact a candidate<sup>23</sup>.

With the implementation of Artificial Intelligence, recruiters can take care of more strategic activities by leaving machine learning systems the task of analyzing candidate data relating to knowledge, skills and work experience, and then comparing them with the requirements of the job description of a given position. The advantage lies in the greater precision and accuracy of the results since the human recruiter, unlike artificial systems, is more likely to make mistakes when carrying out

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<sup>21</sup>Capponi (2024).

<sup>22</sup>Fierro (2022).

<sup>23</sup>Hook (2024).



repetitive and heavy tasks. Algorithms, on the other hand, if trained in the right way, can reduce discrimination and prejudice, creating a more diversified database that excludes gender bias, ethnicity, sexual orientation and any other aspect<sup>24</sup>. AI also allows for improved communication between candidates and companies. An example is virtual chatbot tools that stand out for their promptness in providing answers to the candidate, without having to request the intervention of the recruiter<sup>25</sup>.

The additional benefits of implementing AI in recruitment are particularly evident within multinationals. A pertinent point of reference is the Case Study of Unilever<sup>26</sup>, one of the longest-running and most expansive Anglo-Dutch multinationals. The company operates in various sectors, including food, personal care and household products, and distributes its products in 190 countries around the world, reaching approximately 2.5 billion consumers per day.

By using Artificial Intelligence in the recruitment process, Unilever claims to have effectively saved approximately 50,000 hours normally spent on interviews. The multinational has partnered with two technology companies: HireVue and Pymetrics.

HireVue is a multinational company that develops software for analyzing and evaluating video resumes submitted by candidates and uses a platform known as “Hiring Intelligence,” which has significantly improved the process of finding and identifying new potential talent. The platform allows for the analysis and use of video analysis techniques to evaluate candidates, who are required to submit to the HR group a recording of themselves while they answer a predetermined series of approximately ten questions. The audio of the recording is then automatically transcribed for analysis by the system<sup>27</sup>. The algorithm behind this technology includes approximately 25,000 characteristics, previously defined by the employer, to facilitate the evaluation of candidates based on multiple criteria, including, but not limited to, eye contact, enthusiasm, smile, facial and body expressions, clothing and voice modulation. For example, the algorithm can look for specific terms in the interview, such as the words “I” or “we”: if the candidate tends to speak too much in the singular it could mean that he or she is inclined to work individually, vice versa, a frequent use of “we” could suggest a propensity for team work.

This methodology is clearly advantageous for candidates, as it offers them the flexibility to record their answers at their convenience, and for recruiters, as it allows them to focus exclusively on the final report generated by the video assessment<sup>28</sup>.

Pymetrics, on the other hand, is a company that uses neuroscience and AI with the aim of building a platform that eliminates any type of discrimination in personnel selection processes. In fact, the tests that are administered are the same for all candidates and are evaluated by a non-human operator, eliminating possible prejudices of gender, skin color, name and ethnicity. The platform created by Pymetrics

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<sup>24</sup>For a comparison on the topic, read Hall & Ellis (2023); Fabris, Purpura, Silvello & Susto (2020); Kelly & Mirpourian (2021); Kamiran & Calders (2012).

<sup>25</sup>Martorana (2021).

<sup>26</sup>The company’s portfolio consists of 400 brands, including Algida, Findus, Bertolli, Dove, Calvé, Mentadent, Cif, Magnum, Svelto and Coccolino. Furthermore, given its importance, it registers a continuous demand for qualified personnel, with the strategic objective of recruiting 60% of its workforce from the “millennial” demographic.

<sup>27</sup>Cacciatore & Comelli (2020).

<sup>28</sup>See *Tecnologia* (2021).

involves the completion of various gamified activities, lasting 10-12 minutes, with the aim of evaluating the behavioural and social characteristics of the candidates. In particular, cognitive aptitude, logical reasoning skills, risk propensity and level of motivation are analysed. Subsequently, the scores emerging from the tests are compared with ideal psychometric profiles for specific roles within the company, in order to match the candidate with the roles most suited to them. Compared to traditional tests, consisting of questions and answers, the Pymetrics platform is more dynamic and interactive. These characteristics involve the individual more in completing the tests, promoting much more authentic interactions and behaviours since stress levels are reduced.

In contrast, the technological framework implemented by DeepSense, a company based in San Francisco and New Delhi, uses Artificial Intelligence to analyse the personalities of candidates based on their social curriculum vitae, referring to the Ocean model, used for over two decades in marketing to understand the behavioural choices of consumers; candidates are evaluated on the basis of all the content shared on their social media profiles, such as LinkedIn, Instagram, Facebook and Twitter, with the aim of outlining a profile regarding the personality and the probable behaviour that they will have at work. The Big Five model analyses the candidate on the basis of five dimensions: openness, conscientiousness, extraversion, agreeableness and neuroticism.

## Conclusion

### *Legal Personality for artificial Intelligence: Perspectives de iure Condendo*

In conclusion, it seems necessary to ask ourselves questions about the interaction between humans, workers, technological tools and artificial intelligence<sup>29</sup> and whether it is not an oversimplification to think that the intrinsic value of a potential candidate can be assessed through his competence in online games or his ability to modulate the tone of his voice or facial expressions.

It follows that it is legitimate to ask whether the time is not ripe to outline and attribute, with a system of positive legislation, a legal personality - and consequent responsibility in compliance with the principle of *neminem laedere* - to artificial intelligence, given that the same (intelligence) now produces a significant decisional impact on the lives of people, companies and workers from the selection phase to the job placement phase, as well as an impact on career progression<sup>30</sup>.

From the content point of view, we are - and would be - in the presence of a "dematerialised" legal personality in which the center of attribution of responsibility<sup>31</sup> is the algorithm; in a *quaestio* with legal implications similar to those that exist within

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<sup>29</sup>On the relationship between artificial intelligence and employment cfr. Silberg & Manyika (2019); Zappalà (2021); Piccinini & Isceri (2021). On the topic of data management and transparency in general, read Purtova. (2018) while a focus on digital workers is present in Gaudio (2022).

<sup>30</sup>Cfr. Green, Salvi Del Pero & Verhagen (2023).

<sup>31</sup>On possible and future regulations on civil liability of artificial intelligence systems cfr. Chiappini (2022); Chiappini (2019).

the debate on the relationship between worker and Avatar<sup>32</sup>; in this case, one could identify, conversely, also a legal responsibility with respect to the employer but also with respect to the software used, the programmer, the developer, the producer<sup>33</sup>. The implications also concern the delicate aspects of health and safety and the sanctioning system that derives from it<sup>34</sup>.

The topic, however, is complex and the terrain slippery and originates from problematic aspects or at least ones difficult to define with respect to the predetermination of risk. If on the one hand technology is able to predict a multiplicity of situations, at the same time such predetermination cannot be traced back *sic et simpliciter* to a probabilistic evaluation regarding the potential impact deriving from the adoption of artificial intelligence tools. At the center of the working relationship there is always the human person and this also implies broader reflections of an ethical and algorithmic nature<sup>35</sup>.

The rigidity of an algorithmic evaluation system cannot be completely replaced by “human” aspects, with the risk that even the artificial intelligence system - despite its great predictive capabilities - could lead to an underestimation of the actual risk and create a vulnerability. Likewise, the issues inherent in the management of the employment relationship from both a legal<sup>36</sup> and managerial point of view are of fundamental importance in the renewed scenario of labour market transitions<sup>37</sup> in hybrid organisations<sup>38</sup>.

HR areas, in fact, are called upon to identify both new evolutionary lines towards possible future policy mix paths for overcoming crises and to develop models and/or good practices to be implemented in companies both in terms of organisational models and changes in production processes in supply chains, with a direct impact in terms of corporate social responsibility.

Collective bargaining is always a central role, capable of intervening on fundamental issues such as production models, remuneration policies and work organisation (in order to avoid discriminatory phenomena) together with the training and declination of contractual frameworks<sup>39</sup> on which a timely reflection by the

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<sup>32</sup>On this point and in relation to the legal personality of digital entities, please read Cheong (2022); Donini & Novella (2022); Biasi (2023); Ciucciiovino (2024).

<sup>33</sup>Conti (2023).

<sup>34</sup>On this point, see Cairoli (2024), who, for the compensatory aspects, with regard to the profiles inherent to safety, believes that it would be desirable to facilitate the burden of proof on the worker, based on a reversal of the burden of proof or at least on the basis of a mitigation of the burden of proof itself, perhaps by means of the demonstration of mere “serious, precise and consistent evidence”, as asserted by the ECJ in the ruling of 21 June 2017 on the safety of vaccines.

<sup>35</sup>Cfr. Benanti (2018); Mingo (2024); Basti & Vitiello (2024); Sharkey (2014).

<sup>36</sup>For a reflection on the freedom of work in the digital age and on the transformations of work performance due to the advent of technology, read Bavaro (2021).

<sup>37</sup>On this point, read the study European Commission, Jrc, Ilo, Rani., Pesole, & Gonzalez Vazquez (2024).

<sup>38</sup>For a broader framework, reference is allowed to Caragnano (2023).

<sup>39</sup>For contractual frameworks and the provision of new figures for artificial intelligence, see the amending and supplementary agreement to the CCNL Commerce, Tertiary and Services Conflavoro signed by Conflavoro, Fesica-Confsal e Confsal, 15 aprile 2024. Per un primo commento si legga Conflavoro (2024).

social partners is needed in light of the new skills and new mindsets determined by artificial intelligence<sup>40</sup>.

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<sup>40</sup>Cfr. Massagli & Sacconi (2024). On the role of collective bargaining in relation to the transformations of work, read Fili (2021); on the potential and role of the collective agreement, read Bavaro, Cataudella, Lassandari, Lazzeroni, Tiraboschi & Grandi (2023).

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