Digitalization and labour market: the role of profiling in
occupational transitions.
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Abstract

The contribution delves into the digitalization of active labour market policies (ALMPs) and public employment services (PES), with a specific focus on the unemployed profiling procedure, as it represents one of the most sensitive processes to technological advances, first and foremost the use of Artificial Intelligence. By examining three different European contexts (Flanders, the Netherlands, and Italy), we will try to highlight both the positive impacts and potential drawbacks of digitalization in such a complex area as the labour market.

Keywords: Labour market; Digitalization; Active labour market policies; Profiling; Public employment services.

1. Introduction.

Digitalization is defined by the OECD as "the use of digital technologies and data as well as interconnection that results in new or changes to existing activities"[1] and is usually associated with the field of labour law only from the perspective of the employment relationship. In fact, digital transformation can essentially lead either to a new way of doing business or to a new way of working.[2]

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[1] OECD, *Going Digital: Shaping Policies, Improving Lives, Chapter 1. Understanding digital transformation*, OECD Publishing, 2019, available at;
https://www.oecd-ilibrary.org/sites/58ee7fe5-en/index.html?itemId=/content/component/58ee7fe5-en#:~:text=Digitalisation%20is%20the%20use%20of,effects%20of%20digitisation%20and%20digitalisation.

[2] Garofalo D., *Rivoluzione digitale e occupazione: politiche attive e passive*, in *Il Lavoro nella Giurisprudenza*, 4, 2019, 329. For further insights on this matter, *see*, among many others, Carrieri M., *Il lavoro nella digitalizzazione*, in *Diritti*

An area that, instead, has remained partly unexplored concerning the effects of digitalization on the labour market and,[3] more specifically, on active labour market policies (ALMPs),[4] which are a set of actions and instruments implemented by national and local institutions to promote employment and job placement. This gap in the research has proven to be a weakness in the approach to fully understand the consequences of digitalization in the employment context. In fact, digital transition is not only about the transformation of jobs, but it also has a deep impact on the way governments try to foster employment, job training, and workers reskilling.

Due to the advancement of modern technologies in the digital and IT areas, their widespread diffusion in different spheres of activity, and with the emergence of new needs, the labour market is becoming more fluid and dynamic than ever, with new tasks and jobs urging for workforce. As a result, transitions between work and non-work (presumably caused by unemployment, training programs and professional retraining) have become much more frequent than before. On the one hand, this situation led to an increment in the number of people using public employment services (PES), considered as the public organization in charge of the delivery of labour policies.[5] On the other hand, this situation must force these services to adopt methodologies, infrastructures and approaches that can understand the new labour demand and better protect occupational transitions.[6]

As a result, the challenges arising from the digital revolution primarily revolve around employment services. Although the latter have to some extent embraced the unforeseen wave of technological innovation triggered by the pandemic and the National Recovery and Resilience Plan, in Italy they still fall short of achieving the ambitious goals of digitalization, especially when assessed in a comparative context. Nonetheless, as supported by authoritative literature, the "late mover" position of our legal system enables us to assume

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Lavori Mercati, 2, 2023, and the recent monograph by Lazzeroni L., *Responsabilità sociale d'impresa 2.0 e sostenibilità digitale. Un lettura giuslavoristica*, FUP - USiena Press, Siena, 2024.

[3] On the link between digitalization and the labour market, from the perspective of collective bargaining, *see* Garbuio C., *Digitalization, Labour Market and Collective Bargaining*, in *Italian Labour Law e-Journal*, 16, 2, 2023; Pizzoferrato A., *The role of social partners in the light of the challenges posed by the digitalisation of work and the National Recovery and Resilience Plan*, in *Italian Labour Law e-Journal*, 16, 2, 2023.

[4] In Italy, Stefano Sacchi and Gianluca Scarano dealt with the topic in the "Digitalizzazione e politiche attive del lavoro: indicazioni per la trasformazione organizzativa e la governance dei centri per l'impiego" research project, carried out by the Polytechnic University of Turin as part of the "Progetti per una nuova pubblica amministrazione. Raccolta di idee per orientare il cambiamento delle amministrazioni pubbliche" research program, promoted and co-funded by the Italian National School of Administration (SNA). Recent publications include: Sacchi S., Scarano G., *Le politiche del lavoro nell'era digitale: indicazioni per l'Italia dall'evidenza comparata*, in *Politiche sociali*, 2, 2023; Sacchi S., Scarano G., *Digitalizzare le politiche del lavoro. Da dove si comincia?*, February 6, 2024, available at https://www.secondowelfare.it/primo-welfare/digitalizzare-le-politiche-del-lavoro-da-dove-si-comincia/. *See* also Scarano G., Colfer B., *Linking Active Labour Market Policies to Digitalisation – A Review between Remote and Automated Possibilities*, in *International Journal of Sociology and Social Policy*, 42, 13-14, 2022.

[5] Scarano G., *Politiche attive del lavoro e servizi per l'impiego. Tra miti e riforme*, Egea, Milan, 2021, 49.

[6] Montanari A., *Tecnologie digitali e servizi pubblici per il lavoro: l'esperienza Italiana*, in *Estudos de direito, desenvolvimento e novas tecnologias*, Instituto Iberoamericano de Estudos Jurídicos, Universidade Lusófona do Porto, Porto, 2020, 40.

the implementation of a digital strategy for active policies, oriented to the international best practices.[7]

2. Digital first strategies and the use of Artificial Intelligence in PES.

For many years, public employment services in European countries[8] have been selecting different strategies to adapt to the digitalization of services, from expanding and diversifying delivery channels to strengthening online services. These strategies respond to the EU legislator's indication, as already announced in the Digital Agenda for Europe, which is one of the seven flagship initiatives under the Europe 2020 Strategy. The latter mentioned suggested maximizing the exploitation of information and communication technologies (ICT) to the Member States, in order to promote innovation, economic growth and progress.[9] Therefore, a "digital first" approach has long been embraced at the European level, in which the digital active policies' delivery is increasingly adopted, to facilitate the employment of a "ready-to-work" segment of the population, thus allowing resources to be better endowed for those in need of more intensive assistance, e.g. for people lacking digital literacy.[10]

However, to grant the successful delivery of digital services by PES, special attention should be particularly paid to the initial stage of technological investments. This is needed to establish efficient, user-friendly online platforms, to provide ICT skills training to PES staff, and to offer adequate support for the users that lack the required IT skills.[11]

Implementing such innovations would also allow some decision-making processes to be more efficient: this is why part of the reflection will also intersect with the topic of Artificial Intelligence, capable of reproducing human decision-making in multiple application fields, sometimes with better outcomes in terms of accuracy, swiftness, completeness, and adaptability.[12] One of AI's best potentials emerges in reference to the profiling procedure,[13]

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[7] Sacchi S., *Spunti per una strategia di digitalizzazione delle politiche del lavoro in Italia*, in Di Maio A., Marmo A. R. (eds.), *Il cloud del lavoro*, Rubbettino, Soveria Mannelli, 2022, 365-366.

[8] On employment services in Europe *see* Sartori A., *Servizi per l'impiego e politiche dell'occupazione in Europa*, Maggioli Editore, Rimini, 2013.

[9] Montanari A., nt. (6), 42.

[10] Scarano G., nt. (5), 280.

[11] *See* https://ec.europa.eu/social/main.jsp?catId=1163&intPageId=3451&langId=en.

[12] Costantini F., *Profilazione e "automated decision making" in ambito lavorativo nella giurisprudenza italiana*, in *Il lavoro nella giurisprudenza*, 11, 2019, 986. On the topic of artificial intelligence and related labour law profiles, please *see* Biasi M. (ed.), *Diritto del lavoro e intelligenza artificiale*, Giuffrè, Milan, 2024.

[13] For a systematic review of the literature of the algorithmic profiling in public employment services, *see* Haug K. B., *Structuring the scattered literature on algorithmic profiling in the case of unemployment through a systematic literature review*, in *International Journal of Sociology and Social Policy*, 43, 5/6, 2023. More generally, on the application of AI in the public sector, *see* Wirtz B.W., Weyerer J.C., Geyer C., *Artificial Intelligence and the public sector: applications and challenges*, in *International Journal of Public Administration*, 42, 2, 2019; Zuiderwijk A., Chen Y.-C., Salem F., *Implications of the use of artificial intelligence in public governance: a systematic literature review and a research agenda*, in *Government Information Quarterly*, 38, 3, 2021. On the subject of automated data analysis applied to personnel management, *see* Aimo M., *Dalle schedature dei lavoratori alla profilazione tramite algoritmi: serve ancora l'art. 8 dello Statuto dei lavoratori?*, in *Lavoro e Diritto*, 3-4, 2021, 594 ff. Finally, on the interesting topic of social media profiling in recruitment, please refer to Riccobono A., *Intelligenza artificiale e limiti al social media profiling nella selezione del personale*, in Biasi M., nt. (12).

by being a valuable support in the measurement and analysis of users attitudinal characteristics, facilitating the decision-making procedure, as well as ensuring a proper response to the person's employment status. This is why discussion shall be extensively devoted to this phenomenon. Profiling enriches those data coming from administrative sources, by including behavioral variables in the database, used for predictive analysis. As it is already happening in the Belgian Flanders, the abundance of administrative data leads to the adoption of not only statistical, but also AI-based profiling models, using advanced machine learning techniques, as well as click data[14] from job searches.

Overall, the implementation of Artificial Intelligence in PES operations has numerous benefits, including optimal information exploitation, superior executive readiness, and lower economic impact.[15] However, it is also essential to consider inherent limitations, such as the dangers arising from poor data quality,[16] the presence of data-intensive induced discrimination, issues concerning confidentiality, and algorithms transparency.[17] Analyzing the perspective of operators and users, the former may have concerns about the downsizing of their responsibilities in an area – such as the assessment of clients' needs level – where their expertise traditionally plays a major role.[18] From the perspective of the latter, however, concerns arise about their privacy and possible discrimination. In particular, data-intensive profiling's approaches are the most often criticized in the public debate,[19] as they require a conspicuous amount of personal information, to ensure an adequate level of accuracy, "with the risk of fostering a climate of 'surveillance' on the assisted individual".[20] Much criticism, for instance, concerns the alleged concentration of negative scores on the employment prospects of socially disadvantaged groups, such as ethnic minorities. Thus, critics point out

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[14] Sacchi S., nt. (7), 367.

[15] Scarano G., nt. (5), 279. *See* also Wihlborg E., Larsson H., Hedström K., *"The Computer Says No!" – A Case Study on Automated Decision-making in Public Authorities*, Paper for Hawaii International Conference on System Sciences (HICSS), 2016.

[16] OECD, *Harnessing digitalisation in Public Employment Services to connect people with jobs*, 2022, 1.

[17] Scarano G., nt. (5), 280. On these issues *see* also Mann M., Matzner T., *Challenging algorithmic profiling: the limits of data protection and anti-discrimination in responding to emergent discrimination*, in *Big Data and Society*, 6, 2, 2019. On the topic of algorithmic discrimination, *see* De Petris P., *La discriminazione algoritmica. Presupposti e rimedi*, in Biasi M., nt. (12).

[18] On this topic *see* Busch P.A., Henriksen H.Z., *Digital Discretion: A Systematic Literature Review of ICT and Street-Level Discretion*, in *Information Polity*, 23, 1, 2018.

[19] A famous case in which the algorithm behind the profiling has raised issues of opacity and discrimination is that of Austria. In particular, with respect to the so-called AMAS algorithm introduced in 2018, critics fiercely emphasized the lack of transparency, the use of sensitive information, the potential of the algorithm to amplify inequality in the labour market, and the problems of discrimination, especially gender discrimination. After an initial trial in the period immediately prior to the pandemic, the Data Protection Authority, acknowledging the concerns raised in the media debate, banned its use in 2020 with a warning. The *Arbeitsmarktservice* (AMS) appealed this decision to the Austrian Federal Administrative Court, which agreed with the Agency, finding no breach of transparency obligations. In particular, the Court relied on the fact that the AMAS algorithm had only a support function for the decision to refer unemployed persons to caseworkers, who retained their discretion, and was therefore not an automated decision. Despite the favorable ruling, however, the AMS still decided to withdraw the instrument due to the dissent that had been created (for a more detailed discussion on the matter, *see*: Allhutter D., Cech F., Fischer F., Grill G., Mager A., *Algorithmic Profiling of Jobseekers in Austria: How Austerity Politics Are Made Effective*, in *Frontiers in Big Data*, 3, 5, 2020, available at https://www.frontiersin.org/articles/10.3389/fdata.2020.00005/full; Sacchi S., Scarano G., nt. (4), 279-280. *See* also https://gdprhub.eu/index.php?title=BVwG_-_W256_2235360-1.

[20] Scarano G., nt. (5), 284; Sacchi S., Scarano G., nt. (4), 281.

how algorithmic technologies can cause undesirable effects, as the original goals of fairness and standardization give way to new forms of unequal treatment of users. On the opposite side, proponents of data-intensive approaches use the same arguments to highlight how such tools can detect crystallized discrimination in the labour market.[21]

Also in the light of comparative analysis, these initial considerations outline what has been defined as "the framework of what would be a Copernican revolution"[22] in Italian employment services and labour market policies. Such a revolution should not necessarily start at a central level, but nonetheless it should be welcomed at the level of local and territorial public administrations.[23] In conclusion, the aim of this paper is to highlight, also through the observation of other European PESs, both the positive impacts and the potential drawbacks of digitalization in such a complex area as the labour market, with a specific focus on profiling,[24] being particularly sensitive to technological advancements.

3. Active labour market policies and the digitalization different degrees of responsiveness.

Starting with some theoretical coordinates, as anticipated in the introduction, active labour market policies (ALMPs) are a set of actions and instruments implemented by the state, or other public institutions, in order to foster employment, improve the adaptability of workers to the needs of the labour market, promote social inclusion and intervene, for preventive or curative purposes, on the various causes of unemployment.[25] Their aim is to simplify the matching of labour supply and demand not only through the creation of jobs, but also through the promotion of employability, vocational training, support to entrepreneurship, encouraging labour mobility, and other measures to stimulate workers job placement and career progression.[26]

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[21] Scarano, *ibid*; Sacchi S., Scarano G., *ibid*, 273.

[22] Sacchi S., nt. (7), 368.

[23] Sacchi S., *ibid*.

[24] Some studies have already provided important insight into algorithmic profiling and unemployment: *see*, in particular, Loxha A., Morgandi M., *Profiling the unemployed: a review of OECD experiences and implications for emerging economies*, in *Social Protection Discussion Papers and Notes*, 91051, World Bank, 2014, available at https://openknowledge.worldbank.org/entities/publication/bc72a327-e7e0-5c2a-8d51-3a0c7a2d95cf;
Desiere S., Langenbucher K., Struyven L., *Statistical profiling in public employment services: an international comparison*, in *OECD social, employment and migration working papers*, 224, 2019; Griffin R., Tuite A., Roche Z., Gallagher P., *Report ethical, social, theological, technical review of 1st generation PES algorithms and data use*, EU H2020, HECAT Deliverable 1.3, 2020, available at https://zenodo.org/records/7913459; Körtner J., Bonoli G., *Predictive algorithms in the delivery of public employment services*, prepared for Clegg D., Durazzi N. (eds.), *Research Handbook of Labour Market Policy in Rich Democracies*, Edward Elgar Publishing, Cheltenham, 2022, available at https://osf.io/preprints/socarxiv/j7r8y.

[25] On the employment services and active labour market policies in Italy, *see,* among many others, Scarano G., nt. (5); Varesi P.A., *Il sistema nazionale di servizi per l'impiego e politiche attive del lavoro: aspetti strutturali*, in *Variazioni su Temi di Diritto del Lavoro*, 4, 2022; Ichino P., *Appunti per un rilancio delle politiche attive del lavoro in Italia*, in *Diritto delle Relazioni Industriali*, 1, 2022; Sartori A., *Servizi per l'impiego e politiche attive del lavoro*, in Ferrante V. (ed.), *Il lavoro subordinato: Rapporto contrattuale e tutela dei diritti*, Maggioli, Rimini, 2023, 397 ff. *See* also Griffin R., Tuite A., Roche Z., Gallagher P., nt. (24), 7.

[26] Tursi A., Varesi P.A., *Istituzioni di diritto del lavoro. Rapporti di lavoro e relazioni sindacali nel settore privato*, CEDAM, Padova, 2016, 34.

In terms of classification, there are several methods to categorize ALMPs. A possible approach is based on splitting them into four macro-groups, namely: (i) incentive reinforcement; (ii) employment assistance; (iii) occupation; (iv) human capital investment.[27]

Each of these categories has a different degree of "sensitivity" to digitalization,[28] but the most significant impact of digitalization on active policies is mainly found in the (ii) group, employment assistance,[29] which includes tools aimed at overcoming barriers to labour market participation, such as job search programs, guidance counseling and supply-demand matching.[30] These are the actual employment services and job search programs that increase the likelihood that an unemployed person will be in touch with a potential employer. In this context, digitalization is evident in the implementation of tools that provide operators with more information to support service users. Therefore, it is in this direction that we need to identify the tools that most likely will be affected by digitalization, such as career guidance, users profiling and job-matching. These tools are exploiting the potential offered by technology, to provide a more effective support in guiding individuals career choices, to identify the characteristics of candidates, and to facilitate the matching of job vacancies and job applications. As "career guidance" is the set of activities and services aimed at providing support and advice to the people in the process of choosing and developing their work careers, "job-matching" is the process of identifying and linking the skills, qualifications, and characteristics of the available workers with the requirements of the job positions offered in the labour market. Next, we will focus on "profiling", the processes by which PES classify and categorize jobseekers into groups with similar risk profiles and needs.[31]

4. Profiling: notion and types.

As previously stated, the user-profiling tool represents the process that carries the most considerable implications in relation to the intensive use of data and algorithmic technologies in employment services, namely: (i) an efficient identification of the most appropriate actions for each client, and, even before that, (ii) deciding the subjects of intervention on a priority basis.[32]

The concept of profiling refers to the set of activities and techniques adopted to define the personal and professional profile of people, to obtain a thorough knowledge of the employment services beneficiaries. The main goal is to offer targeted and personalized interventions for guidance, integration and/or reintegration into the labour market, including upskilling or reskilling. An appropriate profiling process also ensures an effective and efficient usage of financial resources for the planning and implementation of employment

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[27] Bonoli G., *The political economy of active labour market policy*, in *Working Papers on the Reconciliation of Work and Welfare in Europe*, 1, 2010, 10 ff, available at https://era.ed.ac.uk/handle/1842/3290.
[28] Scarano G., Colfer B., nt. (4), 101.
[29] *See* Rizza R., Scarano G., *Nuovi modelli di politica del lavoro*, Egea, Milan, 2019, 31 ff.
[30] Scarano G., nt. (5), 15.
[31] Scarano G., Colfer B., nt. (4), 102; Bonoli G., nt. (27), 11-12.
[32] Scarano G., nt. (5), 283.

policies.[33] To provide efficient employment services, it is necessary to divide users into different groups, and profiling is an important support for PES workers in identifying the most appropriate measures and interventions, based on the characteristics and needs of jobseekers.[34] In fact, profiling tools make it possible to differentiate between those who are at risk of becoming long-term unemployed from those who most likely could find a job more quickly.[35]

Three different profiling groups can be distinguished.[36]

First, *rule-based profiling* refers to a process in which decisions regarding access to employment services and interventions are made according to administratively defined rules and criteria. Legislative provisions governing the delivery of employment services generally establish these rules. The profiling based on administrative rules involves the analysis and evaluation of information and data provided by users, to determine whether they meet the requirements for accessing certain employment measures or pathways. This process may involve the assessment of various factors, such as age, educational level, occupational skills, and length of the unemployment period. There are two advantages associated with this first type of profiling: on the one hand, it is not costly, and it is easy to apply, as it does not require a thorough interview with the employment centre operator to identify user needs; on the other hand, it ensures a fair and transparent distribution of the available resources and interventions to promote employment and labour inclusion. Nevertheless, a "negative" aspect is that this approach identifies overly broad categories and groups of individuals, who may present a wide range of very different needs. To address this issue, most employment services combine administrative rules with the analysis carried out by operators, along with the use of tools designed to identify specific user needs.

Second, *statistical profiling* is a predictive model process to assess an individual's degree of disadvantage and employability, to facilitate integration into the labour market. Differently from the first group, statistical profiling has the advantage of considering each user as a unique individual, rather than part of a predefined group: this way, services can be tailored to the person's specific needs. Statistical profiling tools enable objective and standardized assessments, which make it possible to predict how likely jobseekers are to remain unemployed. A score assigned to the level of employability facilitates the identification of individuals who require an in-person appointment with an operator and those who, having a lower score because they are more likely to be employable, can manage their situation on their own.

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[33] ANPAL, *L'orientamento di base e la profilazione qualitativa*, in *Collana Biblioteca ANPAL*, 15, 2020, 3, available at https://www.anpal.gov.it/documents/552016/587068/RapportoProfilazioneQualitativa_maggio2021.pdf/ea8cdcdf-306f-b5a9-6d27-62a39e355383?t=1621586937018.

[34] *See*, on this point, OECD, *Profiling tools for early identification of jobseekers who need extra support*, Policy Brief on Activation Policies, 2018.

[35] ANPAL, nt. (33), 6.

[36] On this point please refer to Loxha A., Morgandi M., nt. (24), 9-10; ANPAL, nt. (33), 7-8; Barnes S.A., Wright S., Irving P., Deganis I., *Identification of latest trends and current developments in methods to profile jobseekers in European public employment services: final report*, Directorate-General for Employment, Social Affairs and Inclusion, European Commission, 2015, available at https://wrap.warwick.ac.uk/70332/.

Lastly, *caseworker-based profiling* relies on the judgment of caseworkers in order to profile jobseekers. It is used, for example, by Estonia, Germany, Greece, Luxembourg, Slovenia and Switzerland. Under this approach, also known as the "caseworker discretion approach",[37] caseworkers enjoy full discretion in analyzing skills and needs of jobseekers. However, in order to assess skills and need, they frequently use quantitative or qualitative tools. In Germany, for example, operators classify jobseekers as "easily" or "difficult" to integrate into the labour market after a one-hour interview at the beginning of the unemployment period. Greece has introduced a data-supported system to make it easier for operators to profile workers as high, medium, or low risk. Estonia's employment service grants total discretion to operators but in return it invests in training to improve the quality of their assessments.

Several countries are currently adopting an integrated approach that combines the benefits of statistical profiling with those of individual case analysis through caseworker assessments. In fact, the subjectivity of the latter can be mitigated when used in combination with statistical profiling.[38] It is important to note that in the application of all the types of profiling mentioned above, the work of PES caseworkers remains a key factor for success, in the diagnostic phase as well as in the intervention plan design.[39] In addition, jobseekers can benefit from a profiling tool only if caseworkers understand and are able to explain them its mechanisms.[40]

In conclusion, to identify the needs of jobseekers, many countries are enhancing digital means of profiling assisted by Artificial Intelligence. AI-based profiling models are considered as "the next step in the development of statistical profiling models. Just like the existing regression-based profiling models, AI-based profiling models predict a jobseeker's likelihood of resuming work within a certain period. But, in contrast to previous models, they use machine learning techniques to predict this outcome and often include many more explanatory variables".[41]

5. Some European examples of digitalization in profiling models.

"If, as mentioned, digitalization does not affect all active labour market policies in the same way, it should also be specified that it is a process that does not affect all countries equally".[42]

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[37] Loxha A., Morgandi M., nt. (24), 9.

[38] Some Authors have argued that, rather than relying only on the discretion of caseworkers, the introduction of a statistical treatment rule can reduce the average duration of unemployment. *See,* in particular, Lechner M., Smith J., *What is the value added by caseworkers?*, in *Labour Economics*, 14, 2, 2007; Staghøj J., Svarer M., Rosholm M., *Choosing the best training programme: is there a case for statistical treatment rules*, in *Oxford Bulletin of Economics and Statistics*, 72, 2, 2010; Desiere S., Langenbucher K., Struyven L., nt. (24).

[39] ANPAL, nt. (33), 8.

[40] Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., *The Work Profiler: Revision and maintenance of a profiling tool for the recently unemployed in the Netherlands*, in *International Social Security Review*, 76, 2, 2023, 112.

[41] Desiere S., Struyven L., *Using artificial intelligence to classify jobseekers: the accuracy– equity trade-off*, in *Journal of Social Policy*, 50, 2, 2021, 368-369.

[42] Sacchi S., Scarano G., nt. (4), 274.

The next paragraphs analyze two European examples of digitalization that allow us to appreciate an increasingly incisive commitment to the adoption of Artificial Intelligence and other advanced computing and statistical methodologies, with the aim of optimizing the inherent activities in employment services. In particular, the use of such tools plays a central role in profiling jobseekers, as well as in the identification of skills gaps and in matching potential candidates with job offers.[43]

5.1. Belgium (Flanders).

Undoubtedly, among the most cutting-edge European employment services, the Belgian region of Flanders stands out with the implementation of an Artificial-Intelligence-based profiling model that estimates the likelihood of becoming long-term unemployed.[44] This model is part of a new "contact strategy" that has been rolled out in 2018.[45] The primary purpose is to help job centres operators in choosing which jobseekers to prioritize.[46] In particular, the purpose of Flanders "digital first" approach is to guarantee that caseworkers have enough time to serve and assist people who have low digital skills.[47]

In detail, in 2014 the Flemish employment service (VDAB - *Vlaamse Dienst voor Arbeidsbemiddeling en Beroepsopleiding*) founded an innovation lab that focuses on developing new applications and analyzing big data.[48] Specifically, the profiling carried out by the VDAB uses a random forest model, trained on large administrative data sets and on data collected at the time of users self-registration.[49] Using this random forest model with hundreds of variables, the lab developed "Next Steps", a statistical profiling model which estimates the probability of becoming unemployed in the long term (>6 months).[50] The model is flexibly built so that it can be easily and regularly updated, both by jobseekers and by the caseworker assisting them in their reintegration into the labour market, when more recent data or new explanatory variables become available.[51]

The underlying data are collected and stored in a data warehouse, and contain detailed information on the socioeconomic characteristics of jobseekers (such as age, place of residence, level of education, nationality/origin, previous work experiences and unemployment spell), as well as some information on their labour market history (such as self-reported work preferences – for example in terms of occupation, sector, or location –

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[43] OECD, nt. (16), 3.

[44] Desiere S., Struyven L., nt. (41), 371.

[45] Desiere S., Langenbucher K., Struyven L., nt. (24), 17.

[46] ANPAL, nt. (33), 11.

[47] Solutions for youth employment, *The Use of Advanced Technology in Job Matching Platforms: Recent Examples from Public Agencies*, in *Draft Discussion Note Series*, 6, May 2023, 8 ff, available at https://thedocs.worldbank.org/en/doc/ceb5c5792ad0d874e9b1c3cc71362f46-0460012023/original/Digital-Job-Matching-Platforms-S4YE-Draft-Note-for-Discussion.pdf.

[48] Desiere S., Langenbucher K., Struyven L., nt. (24), 18.

[49] *See* also Ernst S., Mueller A. I., Spinnewijn J., *Risk Scores for Long-Term Unemployment and the Assignment to Job Search Counseling*, Prepared for *AEA Papers and Proceedings*, May 2024, available at https://personal.lse.ac.uk/SPINNEWI/RiskScores_EMS.pdf.

[50] Desiere S., Langenbucher K., Struyven L., nt. (24), 17.

[51] ANPAL, nt. (33), 11; *see* also OECD, nt. (34), 3.

and participation in training programs). Information collected by caseworkers during previous and current periods of unemployment is also used in the model. Another interesting aspect is the use of behavioral indicators, using jobseekers' activity on the VDAB website as a detector of job search behavior. For example, the so-called "click data" are collected and are used to monitor the activity of jobseekers on the PES website (such as logging in, adding or changing information on the "My Career" user interface, clicking on job vacancies, etc.).[52]

As of now, the model is based solely on administrative data and data entered by jobseekers for other purposes, with no new information on soft skills, attitudes and job search strategies being collected to further improve the accuracy of the instrument. In a more recent version, the number of explanatory variables was reduced, for reasons related to simplification and compliance with privacy and anti-discrimination regulations. Variables with low explanatory power, as well as sensitive information such as origin and disability status, were removed from the model. However, the omission of sensitive variables does not mean that any form of discrimination is eliminated, because the model incorporates this information through other variables, such as language skills.[53]

The profiling model is currently used to decide who to contact first.[54] In detail, jobseekers register with the VDAB and then rely solely on digital services for the first six weeks. After 35 days from registration, the system assigns users a profiling score that indicates their likelihood of accessing employment within the next six months. Based on their profiling score, individuals are divided into four groups, from "very unlikely" to "very likely" to resume work quickly (with profiling score thresholds below 35%, between 35% and 50%, between 50% and 65%, and above 65%). Those users who most at risk of becoming long-term unemployed are contacted first by job centres. Based on a telephone interview, the operator decides whether the jobseeker is self-sufficient or should be referred to a more intensive support. However, operators do not have access to profiling scores, having only the automatically generated lists of unemployed individuals to be contacted by telephone. The list prioritizes jobseekers with low profiling scores. Therefore, the model only ensures that vulnerable jobseekers are contacted first, and it has no effect on the referral decisions of operators. Once all individuals in the first group have been contacted, the operators can begin to address the other groups of jobseekers.[55] The current approach thus combines statistical and operator-based profiling.[56]

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[52] Desiere S., Langenbucher K., Struyven L., nt. (24), 17; OECD, *Artificial intelligence and labour market matching*, in *OECD Social, Employment and Migration Working Papers*, 284, 2023, 24.

[53] Desiere S., Struyven L., nt. (41), 372. On this particular topic *see* Williams B.A., Brooks C.F., Shmargad Y., *How algorithms discriminate based on data they lack: challenges, solutions, and policy implications*, in *Journal of Information Policy*, 8, 2018.

[54] Desiere S., Struyven L., nt. (41), 372.

[55] OECD, nt. (52), 24.

[56] Desiere S., Struyven L., nt. (41), 372.

5.2. The Netherlands.

The second European experience worth mentioning is the Netherlands, where the use of data and technology in employment services has been highly advanced since the early 2000s. This phenomenon was the consequence of the 2008 economic crisis, which led to a containment of public spending and a consequent reduction in the staffing of employment centres.[57] Two important components of the Dutch PESs digitalization are the "Work Folder" and the "Work Profiler".

The "Work Folder" (*Werkmap*) is a digital platform introduced in 2015 that provides a central point of access to all employment-related services and information. It is designed to simplify the interaction among and between citizens and the various actors involved in the PES. More precisely, it is a personal online portal where citizens can store and manage documents and data related to their employment situation. The "Work Folder" allows users to register as unemployed, search for job vacancies, access information on social benefits, register their résumés, and communicate with employment service providers, the UWV (*Uitvoeringsinstituut Werknemersverzekeringen*, the Employee Insurance Agency), or other service providers.[58]

Turning to the second institute, the "Work Profiler" (*Werkverkenner*) is a selection and diagnostic tool that helps the UWV to provide tailored services to unemployment benefit recipients. It was created between 2007 and 2010 (version 1.0) and has been implemented regionally since 2011, expanding to a nationwide application in 2015 for all unemployed people.[59] Jobseekers fill out a short online questionnaire containing 20 questions during the first three months of unemployment, to provide information about their skills, experience, interests, and work preferences. The "Work Profiler" can only be filled in by jobseekers that have already worked before.[60] The questions cover 11 hard and soft factors that are predictive of a job reintegration. These factors are then statistically processed to produce two outcomes, based on the responses given by the jobseeker: the first indicates the likelihood of returning to work within one year; the second outcome provides a quick diagnosis by illustrating which of the 11 factors may be of positive influence, increasing the unemployed chances of re-entering the labour market. Both outcomes are used by the UWV for two main purposes, namely "selection" and "rapid diagnosis". Regarding the former (selection), users chance of returning to work within one year is used to determine whether they should be offered remote or in-person services. Due to cost-cutting imposed by the government, the UWV is no longer able to offer in-person services to all those receiving unemployment benefits. Thus, the "Work Profiler" provides an objective method for identifying individuals who need face-to-face services; the rest of the users will mainly rely on computer services, which remain available to anyone. For "rapid diagnosis", regardless of whether individuals make use of IT

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[57] Sacchi S., Scarano G., nt. (4), 275.

[58] Wijnhoven M.A., Havinga H., *The Work Profiler: A digital instrument for selection and diagnosis of the unemployed*, in *Local Economy*, 29, 6-7, 2014, 742.

[59] For a full analysis of this instrument, please refer to: Wijnhoven M.A., Havinga H., nt. (58); Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., nt. (40).

[60] *See* https://www.cedefop.europa.eu/en/tools/resources-guidance/handbook-transferability/case-studies/work-profiler-werkverkenner.

services or face-to-face assistance, it is important to offer services that increase their chances of reemployment. To this end, the UWV uses the second outcome of the "Work Profiler", a rapid diagnosis based on the 11 predictive factors for re-employment. The individual factor scores indicate the strengths of the unemployed person and those that may need improvement to increase the chances of finding work.[61]

Finally, the profiling results are collected in the "Work Folder" and uploaded to the online service platform (Werkl.nl).[62]

Starting from 2020, an updated version of the model here described was introduced, called "Work Profiler 2.0.", composed of 18 items and able to guarantee an accuracy of 70.3%.[63] Furthermore, the UWV has introduced the so-called "Service Selection Tool", which is a complementary tool to help caseworkers decide what type of service to provide to the unemployed person. For example, in the event that the caseworker sees, in the "Work Profiler", that the jobseeker has a negative view of returning to work, the "Work Profiler" shall not explain why, but the professional and the jobseeker will identify the motivation. The "Service Selection Tool" shows the most common reasons that lead to a negative view of returning to work. If the caseworker believes that it arises, for example, from a lack of job opportunities, the tool suggests which services are most suitable in that specific case.[64] This is not the place to delve further into the functioning of the two models, but it is worth underlining that both the "Work Profiler" and the "Service Selection Tool" are instruments that serve to help the caseworker, whose contribution surely remains fundamental. As correctly highlighted, "the UWV has chosen to use the Work Profiler not as a standalone instrument, but as a complementary tool for professionals. This means that instead of positioning the professional against a profiling tool (as it often occurs in debates), and qualifying one as being better than the other, the "Work Profiler" and professionals should complete one another. Professionals are not without biases, but neither are instruments. With the roles of both being jointly used, the risk of bias is reduced and the collective outcome of the two should be much more accurate than the use of just one".[65]

6. The Italian context: from the pandemic to the digitalization of employment centres.

The Covid-19 global pandemic is one of the events that has profoundly marked human history. However, every trace left by that event has not necessarily had negative connotations. Despite the social and economic catastrophes, the health crisis gave a significant lash to the country's digitalization processes, serving as a catalyst for the events that led to a radical rethinking of our approach to life in general and to work in particular.[66]

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[61] *Wijnhoven M.A., Havinga H.,* nt. (58), 741. *See* also Scarano G., nt. (5), 285, Box 5.3.
[62] Scarano G., *ibid.*
[63] Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., nt. (40), 125.
[64] Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., nt. (40), 128.
[65] Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., nt. (40), 127.
[66] Maruccia G., *Dalla pandemia la spinta all'innovazione e digitalizzazione dei processi aziendali*, April 1st, 2020, available at

Here specifically, the pandemic has accelerated the digital leap of public employment services.[67] On the one hand, the urgent need to adapt to the restrictions imposed by the emergency accelerated the process of digital transformation, leading to a widespread adoption of technological tools to ensure business continuity and the provision of essential personal services, even despite restrictions. On the other hand, in a tumultuous context in which the labour market faced a prolonged sequence of changes, stemming from the processes of automation, robotization, and digitalization, the pandemic demonstrated that a digitally skilled workforce is able to readily adapt to new circumstances.[68]

Over the past four years, innovations that have accompanied employment services in providing jobseekers with support, counseling, and guidance, have followed a twofold direction. Firstly, PESs experimented a strengthening of remote channels for the provision of services that traditionally were offered entirely or partially in person, and sometimes even developing completely new initiatives in this area. Secondly, there was an increase in the automation rates of certain processes for service users and certain back-office activities.[69] In this regard, online assistance resulted in an increased accessibility to information and resources, ensuring a "guided self-service". In addition, various legal systems have improved PESs web portals and provided guidelines and videos to support jobseekers in their path to a labour market integration.[70]

In the Italian system, the institutional actors, who (not without difficulties) play a crucial role in the context of PESs digitalization, are the employment centres (henceforth also just "CPIs", Italian acronym for "centri per l'impiego"). Subject to regional jurisdiction, they carry out functions such as providing career guidance services, offering information on employment opportunities, promoting the matching of labour supply and demand, verifying conditionality criteria to access services, entering personalized service pacts, user profiling, etc.

The health emergency, followed by the adoption of the Recovery Plan,[71] led to a significant change in the management of the CPIs, already plagued by an endemic shortage of adequate human resources and/or qualified personnel, thus triggering a process of digitalization and computerization of services, accompanied by the simultaneous acquisition of appropriate technological equipment. The main transformation was the adoption of remote forms of connection and/or communication, which, through the available

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https://www.treccani.it/magazine/diritto/approfondimenti/diritto_del_lavoro/Dalla_pandemia_la_spinta_all_innovazione_e_digitalizzazione_dei_processi_aziendali.html.

[67] On the subject of the post-pandemic digitalization of work, *see* Malhotra A., *The Postpandemic Future of Work*, in *Journal of Management*, 47, 5, 2021; with particular reference to PES: OECD, *Scaling Up Policies that Connect People with Jobs in the Recovery from COVID-19*, OECD Publishing, 2021.

[68] Piroşcă G.I., Serban-Oprescu G.L., Badea L., Stanef-Puică M-R., Valdebenito C.R., *Digitalization and Labor Market—A Perspective within the Framework of Pandemic Crisis*, in *Journal of Theoretical and Applied Electronic Commerce Research*, 16, 2021, 2843.

[69] Scarano G., Colfer B., nt. (4), 99.

[70] OECD, nt. (16), 3.

[71] ANPAL, *La digitalizzazione post Covid – Nota 1/2023*, in *Collana Focus ANPAL*, 149, 2023, 5, available at https://www.anpal.gov.it/en/dettaglio-notizia/-/asset_publisher/x2jx6UXsFRYV/content/i-centri-per-l-impiego-e-la-digitalizzazione-a-che-punto-siamo-dopo-il-covid. For a discussion on the labour policy measures in the National Recovery and Resilience Plan, *see* Varesi P.A., *PNRR e politiche attive del lavoro: Piani attuativi regionali*, in *Diritto e Pratica del Lavoro*, 20, 2022.

technological tools, replaced the traditional ways of interacting between operators and users. This choice was determined both by the intention of reducing the risk of infection among operators, and by the need of ensuring users an administrative continuity of services.[72] Initially, this was achieved by enhancing the use of tools for daily practices that were already in use, such as e-mails, institutional portals, messaging and telephone interviews. Subsequently, online platforms such as Teams, Meet, Chime and WhatsApp were implemented, and they quickly replaced in-person interactions thus becoming temporary contact channels for users.[73]

It is clear by now that technology will play an increasingly prominent role in the activities carried out by job centres, which will face increasing pressures, both externally and internally, and users demand for services will change significantly. In particular, a major focus will be on supporting "fragile" categories of workers, which include, for example, those with limited digital skills, the long-term unemployed, people over 50, people with disabilities, ethnic minorities and also younger workers. Therefore, it is important to ensure an early and holistic profiling of jobseekers in order to offer early support based on their real needs, but also continuous support after the vulnerable person has entered the labour market.[74] According to some, however, this will lead to a change in the measures implemented from economic recruitment incentives, and to interventions focused on training.[75]

In this last part I will focus on the Italian profiling procedure, as it has recently been modified in the context of implementing the "GOL program".

6.1. Profiling in Italy, considering the most recent legislative updates.

Compared to other European countries, Italian active labour market policies are still far from achieving concrete digitalization targets. However, an exception may be the new users profiling tool introduced in 2020.[76]

In the Italian legal system, users first access to employment services occurs through the electronic provision (via "SIUPL", the unified information system of labour market policies) of the declaration of "immediate availability to carry out work activities and to participate in active labour policy measures agreed with the employment centre"[77] ("DID"), or when they apply for an income support.[78]

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[72] OECD, nt. (16), 2.
[73] ANPAL, nt. (71), 3.
[74] On this topic *see* European Commission, *European Network of Public Employment Services. Support to vulnerable groups*, Thematic paper, 2022, available at https://ec.europa.eu/social/main.jsp?catId=1100&furtherNews=yes&langId=en&newsId=10131.
[75] Marchetti S., Scarpetti G., *L'impatto delle tecnologie digitali sull'erogazione dei servizi dei Centri per l'impiego in Europa*, in *INAPP Working Papers*, 107, 2023, 1.
[76] Sacchi S., Scarano G., nt. (4), 282-283. *See* also Sartori A., nt. (25), 406.
[77] Article 19, Paragraph 1, Legislative Decree No. 150/2015.
[78] Sartori A., *La condizionalità tra coercizione ed empowerment del disoccupato*, in *Variazioni su Temi di Diritto del Lavoro*, 4, 2022, 748; Esposito M., Di Carluccio C., *Attivazione, inclusione e condizionalità nel PNRR*, in *Lavoro e Diritto*, 2, 2023, 286 ff.

According to Article 19, Paragraph 5, Legislative Decree No. 150/2015, "based on the information provided during registration, users of employment services are assigned to a profiling class, in order to assess their level of employability, according to an automated data processing procedure". The profiling class is automatically updated every 90 days, considering the duration of unemployment and other information received through service activities.[79] Registered users are therefore required to contact the employment centre in order to confirm their unemployment status (with different timeframes depending on the type of access to the PES: within 30 days from the declaration of availability; 15 days in case of recipient of an income support benefit). In case of inaction by of the unemployed users, they will be summoned by the employment centre within 90 days from the onset of the unemployment status.[80]

During the meeting with the CPI operator, profiling is carried out, in order to conclude the service pact.[81] The procedure has been extensively revised in the context of the implementation of the Employability Guarantee for Workers National Program ("GOL program"), funded under Mission 5 of the National Recovery and Resilience Plan (PNRR)[82] and aimed at ensuring that the national system of employment services and active labour market policies takes charge of all individuals in unemployment, workers who benefit from wage guarantee fund, and fragile or vulnerable workers (such as young people, women with particular situations of disadvantage, people with disabilities, people aged over 55, working poors, etc.), in order to promote the development of their skills or facilitate their occupational integration.[83] The GOL implementation methods in the different regional

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[79] Article 19, Paragraph 6, Legislative Decree No. 150/2015.

[80] Article 20, Paragraph 1, Legislative Decree No. 150/2015 and Article 4, Ministerial Decree no. 4/2018.

[81] Article 20, Paragraph 1, Legislative Decree No. 150/2015.

[82] Sartori A., nt. (78), 749. The National Recovery and Resilience Plan, under Mission 5C1 "Labour Policies", allocates EUR 6.01 billion for "active labour market policies and employment support", of which EUR 4.4 billion for "active labour market policies and training" and EUR 0.6 billion for "strengthening of employment centres". The first objective is aimed at supporting the employability of workers in transition and the unemployed, through the expansion of active labour market policy measures, within the framework of the GOL program, and at promoting the revision of the governance of the vocational training system in Italy, through the adoption of the "National Plan of New Skills", PNC – Piano Nuove Competenze (*see* Piano Nazionale di Ripresa e Resilienza, *#NextgenerationItalia*, 204 ff., available at https://www.governo.it/sites/governo.it/files/PNRR.pdf). Specifically then, the GOL program was provided for in Article 1, Paragraph 324 of the Budget Law for 2021 (Law No. 178/2020) and adopted by Ministerial Decree on November 5, 2021. For an in-depth analysis on labour policies in the PNRR, please refer to Garofalo D., *Gli interventi sul mercato del lavoro nel prisma del PNRR*, in *Diritto delle Relazioni Industriali*, 1, 2022; Calafà L., *Le politiche del mercato del lavoro nel PNRR: una lettura giuslavoristica*, in *Lavoro e Diritto*, 2, 2023.

[83] Varesi P.A., *Una nuova stagione per le politiche attive del lavoro. Le prospettive tra azioni dell'Unione europea e riforme nazionali*, in *Diritto delle Relazioni Industriali*, 1, 2022, 97. *See* also Cavalca G., *Le politiche del lavoro nel Pnrr: urgenza, ambizioni e rischi*, in *Autonomie locali e servizi sociali*, 2, 2022. An interesting take on the recipients of GOL's active and training policies can be found in Salomone R., *Rischi e opportunità nelle riforme del mercato del lavoro al tempo del PNRR*, in *Lavoro e Diritto*, 2, 2023, 205. The Author, emphasizing not only the GOL program's orientation toward inclusion but also its ambition to link labour supply and demand, considers the companies to be included among the recipients. To this it could be added that the GOL program is not only about the above-mentioned target groups but also seeks to directly involve employment service providers through two tools. The first is the "Labor Market Intelligence", which is an interactive dashboard for analyzing labor market needs, delving into the skills required by businesses and learning about local labour systems. The second is the "Skill Gap Analysis", a tool for assessing the gap between the skills of workers benefiting from the GOL program and those required to fill a particular occupational unit (*see* https://www.anpal.gov.it/-/gol-due-nuovi-strumenti-sperimentali-per-operatrici-e-operatori-dei-servizi-per-l-impiego).

contexts are described in the relevant Regional Implementation Plans (PAR – Piani Attuativi Regionali), which describe how individual regions intend to use the resources distributed with the 2021 and 2023 Interministerial Decrees and how they plan to intercept the beneficiaries envisaged by the PNRR milestones.[84]

The profiling system, previously adopted by ANPAL (the National Agency For Active Labour Market Policies),[85] was insufficient to ensure the homogeneity of procedures now required by the GOL program, due to its lack of selectivity and its excessive discretion. Qualitative profiling was also disjointed due to the different approaches used by regions, which employed tools that were poorly standardized and disconnected from the national system. Therefore, access to the GOL program is currently provided through the so-called "assessment". This is a new methodological approach for quantitative and qualitative profiling, which differs from the past, as it reduces the level of the operator's discretion by using algorithm-based tools and techniques. Two stages can be therefore identified: quantitative profiling, which is done automatically and it indicates whether a person is ready for work (work ready/weaker), while subsequent qualitative profiling requires an interview with the subject.[86]

Regarding quantitative profiling, the aim is to facilitate job centres operators in accessing the numerous (not always properly interconnected) administrative files ("SAP") – which collect workers' data and are updated by them at the time of the DID, or communicated by the company at the time of the establishment or termination of the employment relationship through the Mandatory Communications – in order to obtain a more accurate assessment.[87]

The information to be fed to the system include biographical data, gender, age, city of residence, stay in Italy, education level, employment status in the previous years, number of family members, citizenship, any income support measures, vocational training and qualifications, income support measures, place of residence, driving license etc. The quantitative profiling class is automatically assigned (Class 1: low risk - work ready; Class 2: medium risk - indeterminacy; Class 3: high risk - weakness) to provide the CPI operator with a first indication on the user employability level, based on the risk of becoming long-term unemployed. By using this method, it is possible to estimate the probability of finding employment, by a given date, more accurately, and to define the specific unemployment situation, to tailor interventions more effectively.[88]

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[84] Cappelli S., *GOL: strategie e strumenti per l'attuazione del programma*, Intervento a "Professioni e mercato del lavoro: dati e strumenti", INAPP, Roma, 25 gennaio 2024, 10, available at https://oa.inapp.org/xmlui/handle/20.500.12916/4183.

[85] With the Decree of the Presidency of the Council of Ministers n. 230 of November 22, 2023, ANPAL was abolished. To ensure the effective coordination of active labour market policies and the correct use of European resources as well as the objectives established within the National Recovery and Resilience Plan, the functions of ANPAL have been attributed to the Ministry of Labour.

[86] Valente L., *Il diritto del mercato del lavoro*, CEDAM, Padova, 2023, 104. *See* also Esposito M., Di Carluccio C., nt. (78), 287 ff.

[87] Faioli M., Luccisano M., Cappellazzo N., Smilari A., *Tecnofobie nella Missione 5 del PNRR, condizionalità e dovere di lavorare*, in *Federalismi.it.*, 9, 2023, 180; Valente L., nt. (86), 105.

[88] Valente L., *ibid*, 105-106; Agneni L., Linfante G., Micheletta C., ANPAL Struttura di ricerca III, Ufficio di Statistica e Supporto Metodologico, *L'assessment dei beneficiari GOL. Indicazioni operative per la profilazione qualitativa*, 3, available at https://www.regione.lombardia.it/wps/wcm/connect/3f3a11b4-bc0c-42d4-8cc3-

The information provided by quantitative profiling is supplemented and scrutinized by the caseworker through an orientation interview with users, in the qualitative assessment stage (initial assessment). The aim is to bring forth the qualities of workers, considering their inclinations, experiences, skills and specific needs.[89] Initially, the operator will have the opportunity to view, through a specific link, the information contained in the SAP and those collected during quantitative profiling. Before proceeding with the qualitative profiling interview, the operator must review this data and ensure its validity.[90]

Qualitative profiling aims to create a composite profile of individuals, highlighting differentiated needs in terms of support, assistance, and guidance in job search, training/skills upgrading, or addressing complex needs by activating the network of territorial services.[91] Therefore, this approach gives job centres' operators some leeway in assisting workers during their job search, offering educational and vocational guidance to overcome any obstacles to re-enter labour market.[92]

During the meeting, the operator conducts an interview using a questionnaire to assess three different areas: A. Employment status – "Initial assessment A" (education; how long since last work experience; career path; work experience; mobility and travel; job sought). B. Skills – "Initial assessment B" (Italian communicational skills; language skills; digital skills; extracurricular training; technical-professional skills). C. Personal conditions – "Initial assessment C" (conditions hindering work/job search; family network; dependents; housing condition; personal care).[93] For each question, the employment centre operator assigns a score between 0 and 3. Upon completion of the questionnaire, a maximum score of 15 points can be obtained for each investigated area, for an overall total of 45 points.[94]

During the initial assessment stage, the operator conducts the "professional assessment" using a specific Checklist to analyze users features in relation to employability (such as consistency between expectations and past experience, consistency between expectations and actual competences, readiness toward training and professional growth, readiness for territorial mobility, activation in job search, and effectiveness of job search).[95]

The assessment tool represents the outline for the interview: from a practical point of view, this means that the questions on the questionnaire will not necessarily be asked to the user directly; caseworkers themselves will conduct the interview and articulate the questions in the way they prefer and deem most appropriate and functional for identifying jobseekers condition in reference to each of the investigated dimensions. To do this, operators must

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c36d242f529e/Indicazioni+operativeAssessment+beneficiari+GOL.pdf?MOD=AJPERES&CACHEID=R OOTWORKSPACE-3f3a11b4-bc0c-42d4-8ce3-c36d242f529e-o65j31v.

[89] Valente L., nt. (86), 106.

[90] ANPAL, *Resolution no. 5 of May 9, 2022*, *Allegato B - Strumenti per l'attuazione dell'assessment: profilazione qualitativa,* 2022, 46, available at
https://www.anpal.gov.it/documents/552016/1241390/Delibera+del+Commissario+straordinario+n.+5+d el+9+maggio+2022.pdf/8ff36dbf-17bb-b81a-15d8-20c5e28f25b2?t=1652191988355.

[91] Agneni L., Linfante G., Micheletta C., nt. (88), 3.

[92] Faioli M., Luccisano M., Cappellazzo N., Smilari A., nt. (87), 180. In this regard, Salomone R., nt. (83), 206, stressed that the "tailored" support that the GOL program provide on a large scale is functional for job matching.

[93] *See* ANPAL, nt. (90), 47 ff.

[94] Valente L., nt. (86), 106; ANPAL, *ibid*, 66.

[95] *See* ANPAL, *ibid*, 59.

know well which variables are to be detected, so as to be able to guide users in describing themselves in relation to each of them.[96]

The professional assessment Checklist is intended to "qualify" users profile through further aspects intercepted and evaluated by operators. The Checklist, therefore, serves to investigate aspects deemed not sufficiently explicit through the use of the questionnaire.[97] Furthermore, this assessment does not automatically generate a score based on the information collected, but it allows the outcome of quantitative profiling to be confirmed or not. In fact, operators can intervene on the results of the assessment, adding or subtracting an "additional ceiling of points", which increase or decrease by 3 points the total score obtained in the initial assessment (A, B, or C) or in the in-depth assessment that will be discussed shortly (C + D). In this phase, operators must also consider the outcome of the quantitative profiling (Class 1, 2, or 3), which already provides an initial indication of the path to guide users. These +/- 3 points can be used exclusively when the result of the qualitative-quantitative Assessment is "close" to the "threshold score" (score obtained within +/- 3 points of the threshold value defined for each area). This allows the addition or subtraction of 3 points to potentially alter users "destiny" in terms of the path to activate. The professional assessment can thus modify the outcomes of users characteristics verification, either improving or worsening the identified condition. Consequently, this influences, in accordance with previously established rules, the pathways to be activated (1 - 2 - 3 - 4).[98]

In the event that the score obtained in area C is equal to or greater than 6, caseworkers must further delve into the individuals personal condition to assess the identified vulnerabilities and decide whether to activate pathway 4 (Employment and Inclusion) or not. In this case, the operator proceeds with the in-depth assessment D (Personal Condition), which explores additional psychosocial vulnerabilities, such as economic condition, debt exposure, support networks, relationships with social services, and social functioning. The in-depth assessment of the personal condition rewards up to 15 points (C + D). Overall, the assessment of the personal condition can achieve up to a maximum of 30 points distributed as follows: Initial Assessment - Area C - Personal condition 15; D - In-depth Assessment 15. Based on the final score computed by an algorithm, the worker is directed to one of four GOL pathways, which will form the central part of the personalized service pact drawn up at the end of the interview.[99]

In detail, the four GOL pathways are:[100] 1. Employment reintegration: for the people closest to the labour market, guidance and intermediation services for job guidance. 2. Upskilling: for workers further away from the labour market, but still with expendable skills, training interventions mainly of short duration and with professionalizing content. 3. Reskilling: for workers far from the labour market and with inadequate skills for the required needs, more in-depth professional training. 4. Employment and inclusion: in cases of

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[96] Agneni L., Linfante G., Micheletta C., nt. (88), 6.
[97] Agneni L., Linfante G., Micheletta C., *ibid*, 7.
[98] Valente L., nt. (86), 107; ANPAL, nt. (90), 68.
[99] Valente L., *ibid*, 107-108; ANPAL, *ibid*. According to Esposito M., Di Carluccio C., nt. (78), 288, the term "pact" has more symbolic than technical value, since the existing contractual relationship between ALMPs users and CPIs is not equal but is unbalanced in favor of the latter.
[100] Cavalca G., nt. (83), 295.

complex needs, i.e. in the presence of obstacles and barriers that go beyond the labour dimension, in addition to the previous services, the activation of the network of territorial services (depending on the case, educational, social, social-health, reconciliation) is envisaged.[101]

Pathway no. 4 (Employment and inclusion) is the most problematic,[102] essentially due to two factors: on the one hand, the high degree of weakness of the involved workers, and, on the other, the need to activate collaboration networks between employment services and social services. For these reasons, the Program also envisages the implementation of specific, experimental initiatives for the most vulnerable subjects, also activating protected work or job guidance paths.[103]

Actually, there are five pathways provided by GOL. However, the fifth, which concerns the collective outplacement of workers involved in complex processes of corporate crisis and transition, is not preceded by an individual assessment, it rather presupposes a collective assessment, or an assessment of groups of subjects, considering the corporate situation, the territorial context of reference and the professional skills of the workers.[104] As pointed out by the doctrine, the fifth path, while being the most interesting, is at the same time the least feasible, inasmuch as the GOL regime is poorly coordinated with the wage supplement regulations, reformed in the Budget Law for 2022.[105]

7. Concluding remarks.

Depending on the perspective from which we choose to look at the matter explored so far, both critical and optimistic lines of thought emerge, although they all converge toward openness to the new challenges the labour market is facing, as well as the modernization of public entities that deliver employment services.[106]

In particular, for most employment services users, it can be assumed that the transition to digitalization and the so-called dematerialization[107] have been happening with ease, as they may ensure a more efficient delivery, in terms of timeliness in accessing services and greater transparency in the range of available support. However, as it has been effectively pointed out: "The success of any technological innovation is determined by the degree to which people are able to interact with it".[108]

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[101] https://www.lavoro.gov.it/temi-e-priorita/occupazione/focus/programma-gol/pagine/percorsi.

[102] In the same sense *see* Sacchi S., Scarano G., *Politiche attive e disoccupati work-ready nell'ambito del programma GOL*, in Di Maio A., Marmo A.R. (eds.), *Il Cloud del lavoro 2023/24*, Rubbettino, Soveria Mannelli, 2023, 152.

[103] Varesi P.A., nt. (71), 1156.

[104] Sartori A., nt. (78), 749, footnote no. 44.

[105] On this point, please refer to Faioli M., Luccisano M., Cappellazzo N., Smilari A., nt. (87), 180-181, and in particular to footnotes no. 28-29.

[106] Fasano A., Rossotti L., *Luci e ombre delle disuguaglianze digitali nei Centri per l'impiego in Italia*, in *Scientific Journal on Digital Cultures*, 3, 1, 2018, 112.

[107] *See*, on this point, European Commission, *European Network of Public Employment Services. Dematerialisation of services in EU PES. Assuring full access to the PES services for people with limited opportunities*, 2020, available at https://ec.europa.eu/social/BlobServlet?docId=22954&langId=en.

[108] Pietersen W., *Digital technologies and advanced analytics in PES*, Thematic Paper, EC, Brussels, 2019, 21, available at https://ec.europa.eu/social/BlobServlet?docId=20787&langId=en.

Thus, there will be specific subgroups of vulnerable users who may find it difficult to adapt to changes in the delivery methods of services, such as those with limited digital skills, limited access to Internet services caused either by lack of personal electronic devices or by infrastructural problems, or individuals with particular disabilities who require improved accessibility or, finally, foreign people with language barriers.[109] These critical issues could generate undesired effects. Consequently, instead of improving the usability of services, technology could end up limiting access to them.[110] For these reasons, PESs must ensure that nobody is left behind in the digitalization shift. This involves awareness and understanding of jobseekers needs and specific circumstances, to ensure that alternatives are considered and implemented for the most fragile individuals, whose digital approaches may not be appropriate for technological interactions and service delivery.[111]

From the perspective of employment services, future challenges will focus mainly on structural changes in the labour market: on the one hand, the management of a foreign labour force and shortages of skilled labour, especially in specific productive sectors, thus stimulating the ability to analyze, anticipate and mitigate possible crises; on the other hand, the development of new services to meet the changing needs of PESs users, demanding them a process of continuous improvement. Moreover, CPIs will need to make changes in internal organizational management, paying special attention to issues such as efficiency, quality, privacy, sensitive data protection, use of Artificial Intelligence, security of personal information, as well as opening to collaborations with labour market stakeholders (including both public and private partners).[112]

A key issue concerns undoubtedly the skills of CPIs staff. As previously discussed, job centre operators play an essential role in the unemployed profiling process, identifying their skills, directing them towards appropriate work opportunities and offering support in their reintegration into the labour market. Therefore, it is essential that caseworkers are adequately and technically trained and have a solid knowledge of the labour market dynamics, including sectoral trends, emerging opportunities and the skills employers require. The performance of a monitoring function by the operator is also essential.[113] Additionally, caseworkers must be able to effectively use digital tools and technologies to manage user data, monitor progress and provide personalized assistance, but also to have confidence in the technological tools they use. In addition to technical skills, as we tried to illustrate in the previous paragraph, it is equally important that job centres operators possess transversal and managerial skills,[114]

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[109] European Commission, nt. (107), 7; Marchetti S., Scarpetti G., nt. (75), 11.

[110] Scarano G., nt. (5), 280.

[111] OECD, nt. (16), 9. In this regard, some Authors suggest the possibility, reserved for those without sufficient digital skills, of delegating access and interaction with the PES to another person (Sacchi S., Scarano G., nt. (4), 285). For further insights on this matter, *see* also Sartori A., *Modelli organizzativi dei servizi per l'impiego nell'ordinamento multilivello*, in *Lavoro e Diritto*, 2, 2023, 246.

[112] European Commission, *PES network work programme 2023-2024*, Publications Office of the European Union, Luxembourg, 2023, 6-7, available at https://ec.europa.eu/social/BlobServlet?docId=26646&langId=en; Marchetti S., Scarpetti G., nt. (75), 18. In particular, on the importance of private actors and public-private sinergy *see* Salomone R., nt. (83), 201-204. On the actual role of private actors in the GOL program, *see* Sartori A., nt. (111), 253-254.

[113] Sacchi S., Scarano G., nt. (102), 153.

[114] Marchetti S., Scarpetti G., nt. (75), 18.

which include, for example, effective communication and listening skills. Interesting, in this regard, is the proposal put forward by renowned Authors, which hypothesizes training aimed at two main missions, to which two specific professional categories correspond: "experts in specific guidance, with the ability to work in multidisciplinary teams in the case of the most fragile users; and experts in matching demand and supply who build links with businesses and the productive fabric, with the ability to detect needs".[115]

In conclusion, it is possible to isolate three main areas where action is deemed necessary: (i) to alleviate the technological gap among employment centres operating in different geographical realities; (ii) at this regard, to promote efforts so that technological progress in employment services does not exacerbate territorial disparities; (iii) to make digitalization an opportunity for interoperability between systems in order to harmonize them, facilitating, for example, the interaction of databases that are not currently communicating, but that, together, would be a source of inestimable information value.[116] In this respect, it has been correctly observed how even more than a quarter of a century after the Bassanini reform in 1997, interoperability between the regional information systems and the central one is still not guaranteed, nor the electronic worker's file envisaged by Article 14 of Legislative Decree No. 150 of 2015, which contains information on educational and training paths, work periods, the use of public benefits and contribution payments for the purposes of social security cushions, has been implemented.[117] Also due to this reduced interoperability, the activity of private entities is necessarily limited.[118]

Bibliography

Agneni L., Linfante G., Micheletta C., ANPAL Struttura di ricerca III, Ufficio di Statistica e Supporto Metodologico, *L'assessment dei beneficiari GOL. Indicazioni operative per la profilazione qualitativa*, 1-32, available at https://www.regione.lombardia.it/wps/wcm/connect/3f3a11b4-bc0c-42d4-8ce3-c36d242f529e/Indicazioni+operativeAssessment+beneficiari+GOL.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-3f3a11b4-bc0c-42d4-8ce3-c36d242f529e-o65j31v;

Aimo M., *Dalle schedature dei lavoratori alla profilazione tramite algoritmi: serve ancora l'art. 8 dello Statuto dei lavoratori?*, in *Lavoro e Diritto*, 3-4, 2021, 585-600;

Allhutter D., Cech F., Fischer F., Grill G., Mager A., *Algorithmic Profiling of Jobseekers in Austria: How Austerity Politics Are Made Effective*, in *Frontiers in Big Data*, 3, 5, 2020, 1-17;

ANPAL, *L'orientamento di base e la profilazione qualitativa*, Collana Biblioteca ANPAL, 15, 2020, 1-73, available at https://www.anpal.gov.it/documents/552016/587068/RapportoProfilazioneQualitativa_maggio2021.pdf/ea8cdcdf-306f-b5a9-6d27-62a39e355383?t=1621586937018;

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[115] Sacchi S., Scarano G., nt. (4), 287.
[116] Fasano A., Rossotti L., nt. (106), 119.
[117] Sacchi S., Scarano G., nt. (4), 284.
[118] Sacchi S., Scarano G., nt. (102), 154.

ANPAL, *La digitalizzazione post Covid – Nota 1/2023*, Collana Focus ANPAL no. 149, 2023, 1-12, available at https://www.anpal.gov.it/en/dettaglio-notizia/-/asset_publisher/x2jx6UXsFRYV/content/i-centri-per-l-impiego-e-la-digitalizzazione-a-che-punto-siamo-dopo-il-covid;

ANPAL, *Resolution no. 5 of May 9, 2022*, *Allegato B - Strumenti per l'attuazione dell'assessment: profilazione qualitativa*, 2022, available at https://www.anpal.gov.it/documents/552016/1241390/Delibera+del+Commissario+straordinario+n.+5+del+9+maggio+2022.pdf/8ff36dbf-17bb-b81a-15d8-20c5e28f25b2?t=1652191988355;

Barnes S.A., Wright S., Irving P., Deganis I., *Identification of latest trends and current developments in methods to profile jobseekers in European public employment services: final report*, Directorate-General for Employment, Social Affairs and Inclusion, European Commission, 2015, 1-104, available at https://wrap.warwick.ac.uk/70332/;

Biasi M. (ed.), *Diritto del lavoro e intelligenza artificiale*, Giuffrè, Milan, 2024;

Bonoli G., *The political economy of active labour market policy*, in *Working Papers on the Reconciliation of Work and Welfare in Europe*, 1, 2010, 1-28;

Busch P.A., Henriksen H.Z., *Digital Discretion: A Systematic Literature Review of ICT and Street-Level Discretion*, in *Information Polity*, 23, 1, 2018, 3-28;

Calafà L., *Le politiche del mercato del lavoro nel PNRR: una lettura giuslavoristica*, in *Lavoro e Diritto*, 2, 2023, 163-192;

Cappelli S., *GOL: strategie e strumenti per l'attuazione del programma*, Intervento a "Professioni e mercato del lavoro: dati e strumenti", INAPP, Roma, 25 gennaio 2024, 1-21, available at https://oa.inapp.org/xmlui/handle/20.500.12916/4183;

Carrieri M., *Il lavoro nella digitalizzazione*, in *Diritti Lavori Mercati*, 2, 2023, 211-236;

Cavalca G., *Le politiche del lavoro nel Pnrr: urgenza, ambizioni e rischi*, in *Autonomie locali e servizi sociali*, 2, 2022, 291-307;

Costantini F., *Profilazione e "automated decision making" in ambito lavorativo nella giurisprudenza italiana*, in *Il Lavoro nella Giurisprudenza*, 11, 2019, 984-996;

De Petris P., *La discriminazione algoritmica. Presupposti e rimedi*, in Biasi M. (ed.), *Diritto del lavoro e intelligenza artificiale*, Giuffrè, Milan, 2024;

Desiere S., Langenbucher K., Struyven L., *Statistical profiling in public employment services: an international comparison,* in *OECD Social, Employment and Migration Working Papers*, 224, OECD Publishing, 2019, 1-28;

Desiere S., Struyven L., *Using artificial intelligence to classify jobseekers: the accuracy– equity trade-off*, in *Journal of Social Policy*, 50, 2, 2021, 367-385;

Ernst S., Mueller A. I., Spinnewijn J., *Risk Scores for Long-Term Unemployment and the Assignment to Job Search Counseling*, Prepared for AEA Papers and Proceedings, May 2024, 1-5, available at https://personal.lse.ac.uk/SPINNEWI/RiskScores_EMS.pdf;

Esposito M., Di Carluccio C., *Attivazione, inclusione e condizionalità nel PNRR*, in *Lavoro e diritto*, 2, 2023, 279-308;

European Commission, *European Network of Public Employment Services. Dematerialisation of services in EU PES. Assuring full access to the PES services for people with limited opportunities*, 2020, 1-30, available at https://ec.europa.eu/social/BlobServlet?docId=22954&langId=en;

European Commission, *European Network of Public Employment Services. Support to vulnerable group*s, Thematic paper, 2022, available at https://ec.europa.eu/social/main.jsp?catId=1100&furtherNews=yes&langId=en&newsId=10131;

European Commission, *PES network work programme 2023-2024*, Publications Office of the European Union, Luxembourg, 2023, 1-9, available at https://ec.europa.eu/social/BlobServlet?docId=26646&langId=en;

Faioli M., Luccisano M., Cappellazzo N., Smilari A., *Tecnofobie nella Missione 5 del PNRR, condizionalità e dovere di lavorare*, in *Federalismi.it.*, 9, 2023, 170-211;

Fasano A., Rossotti L., *Luci e ombre delle disuguaglianze digitali nei Centri per l'impiego in Italia*, in *Scientific Journal on Digital Cultures*, 3, 1, 2018, 111-120;

Garbuio C., *Digitalization, Labour Market and Collective Bargaining*, in *Italian Labour Law e-Journal*, 16, 2, 2023, 59-75;

Garofalo D., *Gli interventi sul mercato del lavoro nel prisma del PNRR*, in *Diritto delle Relazioni Industriali*, 1, 2022, 114-160;

Garofalo D., *Rivoluzione digitale e occupazione: politiche attive e passive*, in *Il lavoro nella giurisprudenza*, 4, 2019, 329-349;

Griffin R., Tuite A., Roche Z., Gallagher P., *Report ethical, social, theological, technical review of 1st generation PES algorithms and data use*, EU H2020, HECAT Deliverable 1.3, 2020, 1-53;

Haug K. B., *Structuring the scattered literature on algorithmic profiling in the case of unemployment through a systematic literature review*, in *International Journal of Sociology and Social Policy*, 43, 5/6, 2023, 454-472;

Ichino P., *Appunti per un rilancio delle politiche attive del lavoro in Italia*, in *Diritto delle Relazioni Industriali*, 1, 2022, 161-173;

Körtner J., Bonoli G., *Predictive algorithms in the delivery of public employment services*, prepared for Clegg D., Durazzi N. (eds.), *Research Handbook of Labour Market Policy in Rich Democracies*, Edward Elgar Publishing, Cheltenham, 2022, 1-19;

Lazzeroni L., *Responsabilità sociale d'impresa 2.0 e sostenibilità digitale. Un lettura giuslavoristica*, FUP - USiena Press, Siena, 2024;

Lechner M., Smith J., *What is the value added by caseworkers?*, in *Labour Economics*, 14, 2, 2007, 135-151;

Loxha A., Morgandi M., *Profiling the unemployed: a review of OECD experiences and implications for emerging economies*, in *Social Protection and Labor Discussion Papers*, 1424, World Bank, 2014, 1-45;

Malhotra A., *The Postpandemic Future of Work*, in *Journal of Management*, 47, 5, 2021;

Mann M., Matzner T., *Challenging algorithmic profiling: the limits of data protection and anti-discrimination in responding to emergent discrimination*, in *Big Data and Society*, 6, 2, 2019, 1-11;

Marchetti S., Scarpetti G., *L'impatto delle tecnologie digitali sull'erogazione dei servizi dei Centri per l'impiego in Europa*, INAPP Working Papers, 107, 2023, 1-19;

Maruccia G., *Dalla pandemia la spinta all'innovazione e digitalizzazione dei processi aziendali*, April 1st, 2020, available at https://www.treccani.it/magazine/diritto/approfondimenti/diritto_del_lavoro/Dalla_pandemia_la_spinta_all_innovazione_e_digitalizzazione_dei_processi_aziendali.html;

Montanari A., *Tecnologie digitali e servizi pubblici per il lavoro: l'esperienza Italiana*, in *Estudos de direito, desenvolvimento e novas tecnologias*, Instituto Iberoamericano de Estudos Jurídicos, Universidade Lusófona do Porto, Porto, 2020, 40-51;

OECD, *Artificial intelligence and labour market matching*, in *OECD Social, Employment and Migration Working Papers*, 284, 2023;

OECD, *Going Digital: Shaping Policies, Improving Lives, Chapter 1. Understanding digital transformation*, OECD Publishing, 2019;

OECD, *Harnessing digitalisation in Public Employment Services to connect people with jobs*, 2022;

OECD, *Profiling tools for early identification of jobseekers who need extra support*, Policy Brief on Activation Policies, 2018;

OECD, *Scaling Up Policies that Connect People with Jobs in the Recovery from COVID-19*, OECD Publishing, 2021, available at https://www.oecd.org/coronavirus/policy-responses/scaling-up-policies-that-connect-people-with-jobs-in-the-recovery-from-covid-19-a91d2087/;

Pietersen W., *Digital technologies and advanced analytics in PES*, Thematic Paper, EC, Brussels, 2019, 1-26, available at https://ec.europa.eu/social/BlobServlet?docId=20787&langId=en;

Piroşcă G.I., Serban-Oprescu G.L., Badea L., Stanef-Puică M-R., Valdebenito C.R., *Digitalization and Labor Market—A Perspective within the Framework of Pandemic Crisis*, in *Journal of Theoretical and Applied Electronic Commerce Research*, 16, 2021, 2843-2857;

Pizzoferrato A., *The role of social partners in the light of the challenges posed by the digitalisation of work and the National Recovery and Resilience Plan*, in *Italian Labour Law e-Journal*, 16, 2, 2023, 139-147;

Riccobono A., *Intelligenza artificiale e limiti al social media profiling nella selezione del personale*, in Biasi M. (ed.), *Diritto del lavoro e intelligenza artificiale*, Giuffrè, Milan, 2024, 253-279;

Rizza R., Scarano G., *Nuovi modelli di politica del lavoro*, Egea, Milan, 2019;

Sacchi S., *Spunti per una strategia di digitalizzazione delle politiche del lavoro in Italia*, in Di Maio A., Marmo A. R. (eds.), *Il cloud del lavoro*, Rubbettino, Soveria Mannelli, 2022, 365-368;

Sacchi S., Scarano G., *Le politiche del lavoro nell'era digitale: indicazioni per l'Italia dall'evidenza comparata*, in *Politiche Sociali*, 2, 2023, 269-292;

Sacchi S., Scarano G., *Politiche attive e disoccupati work-ready nell'ambito del programma GOL*, in Di Maio A., Marmo A.R. (eds.), *Il Cloud del lavoro 2023/24*, Rubbettino, Soveria Mannelli, 2023, 151-154;

Sacchi S., Scarano G., *Digitalizzare le politiche del lavoro. Da dove si comincia?*, February 6, 2024, available at https://www.secondowelfare.it/primo-welfare/digitalizzare-le-politiche-del-lavoro-da-dove-si-comincia/;

Salomone R., *Rischi e opportunità nelle riforme del mercato del lavoro al tempo del PNRR*, in *Lavoro e Diritto*, 2, 2023, 193-210;

Sartori A., *Servizi per l'impiego e politiche dell'occupazione in Europa*, Maggioli, Rimini, 2013;

Sartori A., *La condizionalità tra coercizione ed empowerment del disoccupato*, in *Variazioni su Temi di Diritto del Lavoro*, 4, 2022, 736-777;

Sartori A., *Modelli organizzativi dei servizi per l'impiego nell'ordinamento multilivello*, in *Lavoro e Diritto*, 2, 2023, 231-258;

Sartori A., *Servizi per l'impiego e politiche attive del lavoro*, in V. Ferrante (ed.), *Il lavoro subordinato: Rapporto contrattuale e tutela dei diritti*, Maggioli, Rimini, 2023, 397-437;

Scarano G., *Politiche attive del lavoro e servizi per l'impiego. Tra miti e riforme*, Egea, Milan, 2021;

Scarano G., Colfer B., *Linking Active Labour Market Policies to Digitalisation – A Review between Remote and Automated Possibilities*, in *International Journal of Sociology and Social Policy*, 42, 13-14, 2022, 98-112;

Solutions for youth employment, *The Use of Advanced Technology in Job Matching Platforms: Recent Examples from Public Agencies*, in *Draft Discussion Note Series*, 6, May 2023, 1-30, available at https://thedocs.worldbank.org/en/doc/ceb5c5792ad0d874e9b1c3cc71362f46-0460012023/original/Digital-Job-Matching-Platforms-S4YE-Draft-Note-for-Discussion.pdf;

Staghøj J., Svarer M., Rosholm M., *Choosing the best training programme: is there a case for statistical treatment rules*, in *Oxford Bulletin of Economics and Statistics*, Oxford, 72, 2, 2010, 172-201;

Tursi A., Varesi P.A., *Istituzioni di diritto del lavoro. Rapporti di lavoro e relazioni sindacali nel settore privato*, CEDAM, Padova, 2016;

Valente L., *Il diritto del mercato del lavoro*, CEDAM, Padova, 2023.

Varesi P.A., *Il sistema nazionale di servizi per l'impiego e politiche attive del lavoro: aspetti strutturali*, in *Variazioni su temi di diritto del lavoro*, 4, 2022, 607-631;

Varesi P.A., *PNRR e politiche attive del lavoro: Piani attuativi regionali*, in *Diritto e Pratica del Lavoro*, 20, 2022, 1153-1157;

Varesi P.A., *Una nuova stagione per le politiche attive del lavoro. Le prospettive tra azioni dell'Unione europea e riforme nazionali*, in *Diritto delle Relazioni Industriali*, 1, 2022, 75-113;

Wihlborg E., Larsson H., Hedström K., *"The Computer Says No!" – A Case Study on Automated Decision-making in Public Authorities*, Paper for Hawaii International Conference on System Sciences (HICSS), 2016;

Wijnhoven M.A., Dusseldorp E., Guiaux M., Havinga H., *The Work Profiler: Revision and maintenance of a profiling tool for the recently unemployed in the Netherlands*, in *International Social Security Review*, 76, 2, 2023, 109-134;

Wijnhoven M.A., Havinga H., *The Work Profiler: A digital instrument for selection and diagnosis of the unemployed*, in *Local Economy*, 29, 6-7, 2014, 740-749;

Williams B.A., Brooks C.F., Shmargad Y., *How algorithms discriminate based on data they lack: challenges, solutions, and policy implications*, in *Journal of Information Policy*, 8, 2018, 78-115;

Wirtz B.W., Weyerer J.C., Geyer C., *Artificial Intelligence and the public sector: applications and challenges*, in *International Journal of Public Administration*, 42, 2, 2019, 596-615;

Zuiderwijk A., Chen Y.-C., Salem F., *Implications of the use of artificial intelligence in public governance: a systematic literature review and a research agenda*, in *Government Information Quarterly*, 38, 3, 2021, 1-19.