BETTER POLICIES FOR BETTER LIVES

Harnessing digitalisation in Public Employment Services to connect people with jobs

June 2022 https://www.oecd.org/employment/activation.htm

Spurred on by the unprecedented challenges of the COVID-19 pandemic, Public Employment Services (PES) are accelerating digitalisation across all areas of services and operations. This policy brief provides an overview of how OECD countries are harnessing digitalisation to improve the effectiveness and efficiency of PES in connecting people with good jobs, and monitoring and evaluating the performance of the digital tools.

Key findings

- Digitalisation offers significant opportunities for PES to deliver better services to their clients.
- In response to the COVID-19 pandemic, PES made significant changes to their services and operations. Many of these changes consisted of investments in IT infrastructure to enable PES to deal with the increased client numbers and to enable service continuity in face of restrictions to in-person service provision. Changes to the delivery models of training and job-search support and counselling were particularly common across countries at this time.
- As a result, the pandemic accelerated the digital leap of PES; a trend that is set to continue, with many countries engaging in ongoing digital advancements. These more recent efforts most commonly focus on improving and modernising existing infrastructure (e.g. enhancing jobseeker profiling and job matching tools). However, countries are also engaging in efforts to digitalise other processes/services and adopt Artificial Intelligence (AI) tools or other advanced analytics.
- The adoption of AI in PES activities provides many benefits, including better use of data and in a timelier manner. However, limitations exist, including risks posed by poor quality data and the inability for these tools to consider intangible information on a client's situation beyond what exists in the input data.
- All digitalisation efforts within PES should be subject to strict monitoring and evaluation via counterfactual impact evaluations to understand their impact on the provision of services to both jobseekers and employers.
- PES need to ensure that nobody is left behind on the digitalisation journey. This includes paying special attention to clients lacking digital skills or means of access and other vulnerable groups who may need other channels for service delivery, such as in-person services.

Digitalisation to support PES capacity

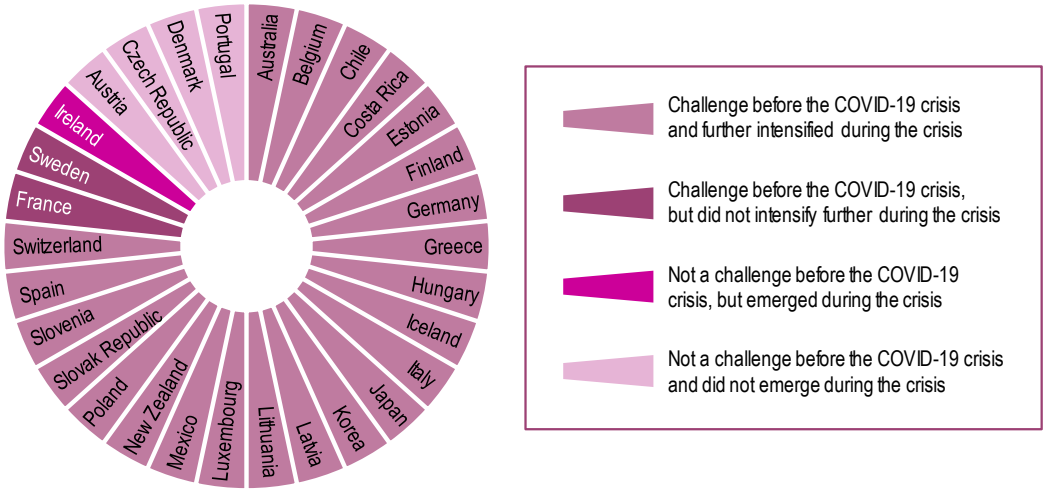
Digitalisation represents a major opportunity for Public (and private) Employment Services (PES) to reach out and provide services to large numbers of clients with diverse needs, while co-operating with providers and other partners of "the PES ecosystem". Digitalisation can encompass almost all PES operations and services, covering applications and user interfaces for better services for jobseekers and employers, such as self-service tools for job/employee search, tools for mapping skills, and providing career services and chatbots to facilitate information sharing and counselling. In addition, a crucial part of digitalisation covers the back-office infrastructure for PES staff and external service providers, such as jobseeker profiling tools to target support, job-search monitoring tools, automation of administrative processes, and fraud detection. In addition to the technology and architecture of the digital infrastructure, a key component for successful performance of the tools is data – data that are collected and accessed from external registers through the infrastructure.

Digitalisation can augment PES capacity (to do more with potentially less cost), increase clients' satisfaction with PES services, facilitate jobseekers to find good jobs, and assist employers to meet their needs for labour, thereby improving the effectiveness and efficiency of PES. During the pandemic, the utilisation of digital tools by PES was a cost-effective method to deal with increased demand for services and reduced physical capacity. Nevertheless, the pandemic also highlighted the differences that exist in PES IT infrastructure and digitalisation between countries. Countries with well-developed digital services were able to fully serve their clients during the lockdowns and despite the restrictions imposed on face-to-face contact (OECD, 2021[1]). For many other countries, the pandemic spurred on major investments in the use of technology and digitalisation by PES to enable jobseeker registration and benefit applications, as well as remote provision of employment services. Nevertheless, there is still considerable scope for further investments in digital services, IT infrastructure and digital tools across PES in OECD countries. Such investments are costly, require good preparation and should be embedded in broader PES strategies. In addition, they should be evaluated to ensure they provide value for money and should be agile enough to respond to changing needs.

Further investments in the PES IT infrastructure are needed in many countries

The need to invest in modernising and enhancing the IT infrastructure of PES is not a new challenge faced by countries. For more than half of OECD countries this was something that they had already been facing in recent years in line with broader digitalisation trends in economies and societies and continuous pressure to provide effective and efficient employment services to a large and diverse set of clients (Figure 1). However, the emergence of the COVID-19 pandemic, with the resultant increases in client numbers, rising pressure on budgets and challenges for service continuity, focused the need to invest in PES IT infrastructure and made it necessary for countries to take immediate action.

Figure 1. The pandemic exacerbated the need to invest in PES IT infrastructure for many countries



Note: This figure is based on 30 country responses to a question on a number of pre-defined challenges faced by PES.
Source: Country answers to OECD Questionnaire on Policy Responses to the COVID-19 Crisis, conducted in the end of 2021.

The extent to which PES felt increased pressure to invest in their IT infrastructure during the pandemic period was not even across countries, driven by differences in each country's starting point when the pandemic hit. For many countries, their journey towards digitalisation was already well underway, making them better equipped to respond to the changed environment.

While the emergency response phase has now passed, the pandemic has undoubtedly reinforced a trend that was already underway, shedding light on the benefits brought by enhanced digitalisation and modern IT infrastructure across all activities of the PES.

Delivery models and channels had to change significantly during the pandemic, accelerating the digital leap in PES

Containment measures and limits to in-person services required putting in place digital or remote means of accessing and delivering services in all countries. Digital advancements have been most evident in the areas of labour market services (notably job-search support and counselling) and training, where over 70% of OECD countries engaged in initiatives to enable digital or remote delivery (OECD (2021[1]) and OECD (forthcoming[2])). In contrast, initiatives that focus on in-work experience for jobseekers could not be substituted with digital alternatives as easily.

In providing jobseekers with job-search support, counselling and guidance, PES digitalisation during the COVID-19 pandemic occurred in two main categories:

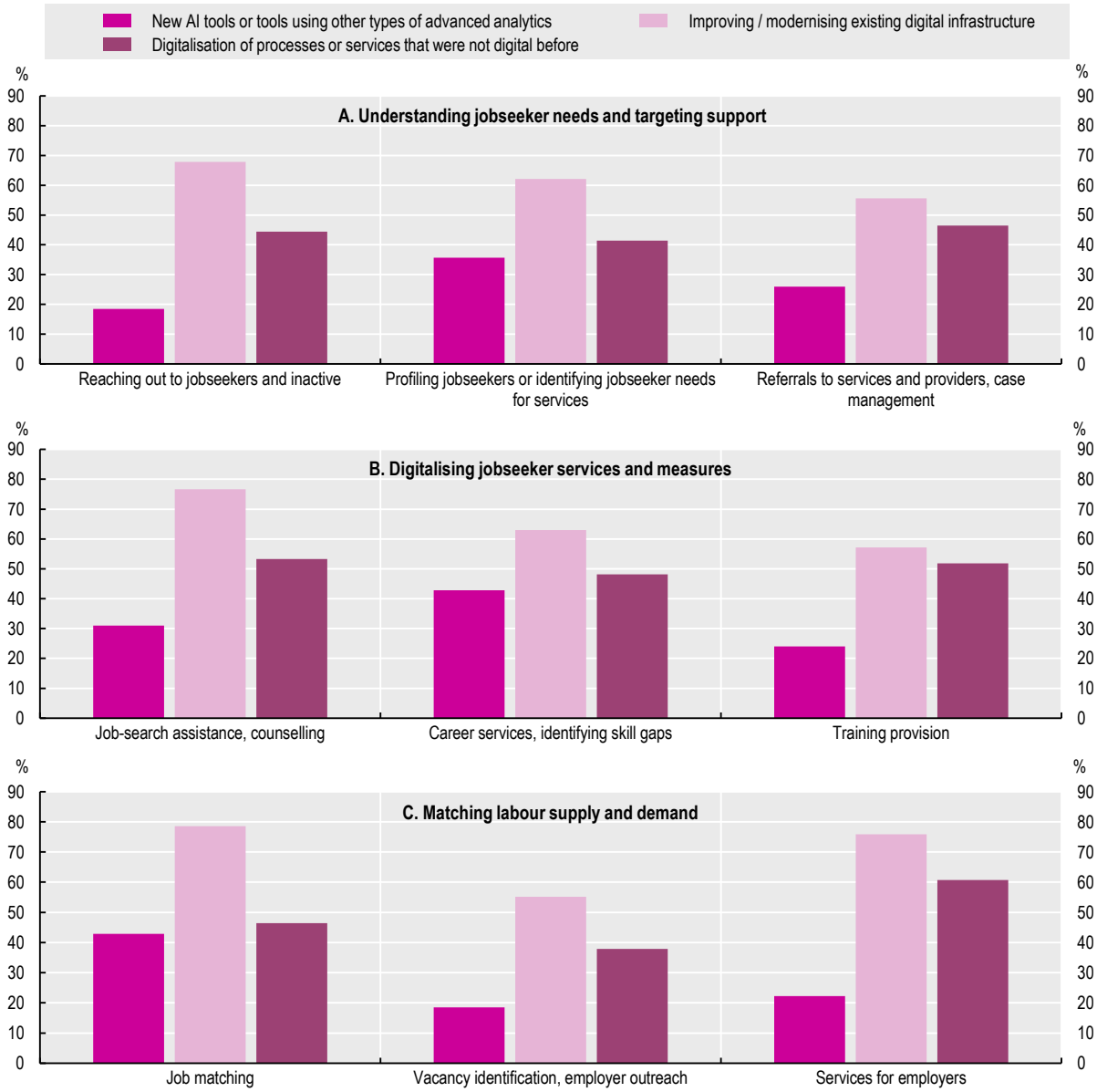
- *Interactive or active digital service provision* involved PES counsellors engaging with clients via online or other remote channels, replacing the traditional in-person contact. While switching to remote means was common across most OECD countries, some countries also developed new initiatives in this area. For example, New Zealand introduced a *Rapid Return to Work Service* which was a phone-based employment service lasting up to six weeks to help clients with work readiness, assessing transferable skills and job interview preparation.
- *Static or passive online support* saw information and resources made accessible to clients to provide guided self-service. These services aimed to guide clients, particularly new registrants, with access to information on employment opportunities, training courses and other available support. In addition, countries also enhanced their PES websites and provided guidelines and videos to assist jobseekers in their labour market inclusion pathway. For example, the Austrian PES developed a new job search portal "*alle jobs"* (all the jobs), which was made available for free without registration and was integrated into the existing PES mobile application (*AMS Job App*). In addition, some countries opted to increase the use of automated engagement with clients. AI-augmented chatbots can help users specify their needs, identify what they are entitled to, and apply for relevant support. They could potentially yield a double dividend: alleviate the burden on PES staff and improve service accessibility and take-up. In the United States, for example, the use of smart bots took a leap forward during the pandemic, and helped PES staff deal with the rapid surge in unemployment by answering many inquiries about available financial supports – notably those under the newly implemented COVID-19 measures (NASCIO, CDG and IBM, 2021[3]; Accenture, 2021[4]).

PES are continuing their digitalisation journey, including via the application of advanced technologies

While digitalisation during the pandemic largely focused on boosting digital channels, recent developments have aimed more to improve service delivery overall and are taking place across PES activities, from reaching out to people needing support and identifying the right support, to providing digitally enhanced services and measures for both jobseeker and employers. PES have or plan to improve and modernise their existing digital infrastructure extensively, as well as digitalise processes or services that were not digital before (Figure 2). Furthermore, countries are increasingly engaging in efforts to adopt AI and other advanced IT and statistical approaches to enhancing their activities, particularly in profiling jobseekers, identifying skill gaps and matching jobseekers and vacancies.

Figure 2. PES are engaging in widespread efforts to employ digitalisation for better services

Share of responding countries where PES have increased their use of digitalisation in 2021 or will likely do so in 2022 across three key areas of PES activity



Note: This figure is based on 28 country responses. Percentages refer to the share of responding countries engaging in increased digitalisation within each sub-category (changes can be numerous and simultaneous across more than one type of development).
Source: Country answers to OECD Questionnaire on Policy Responses to the COVID-19 Crisis, conducted in the end of 2021.

Understanding jobseeker needs and targeting support

Reaching out to jobseekers and the inactive has seen a high degree of digital development, digitalising services not yet digital and enhancing digital infrastructure already in place. Innovations in this area include the development by Italy of apps to reach out to young persons not in education, employment, or training (NEETs).

In identifying the needs of jobseekers, many countries are enhancing their digital jobseeker profiling tools, often assisted by AI. In Wallonia (Belgium), a new profiling service has been put in place in early 2022 using machine learning approach to generate a predictive job proximity model. Similarly, Luxembourg is engaging in a project using AI to assess a jobseeker's odds of returning to a job based on their profile and identify the best suited services to provide accordingly. The award-winning AI-powered profiling tool adopted by the Estonian PES in the end of 2020 and further enhanced in 2022 segments jobseekers into different service streams by their probability to (re-)integrate into the labour market soon with an accuracy of 95%, as well as assesses their main factors for entering into employment and returning into unemployment (Leinuste, 2021[5]; 2022[6]). A similar profiling tool using machine learning and administrative data was adopted in the Lithuanian PES in the end of 2021, replacing a tool segmenting jobseekers based on survey data only (OECD, 2022[7]).

Countries are also improving digital support for case management. Luxembourg's PES introduced a social assistance map (hosted on a website), which can be used by case managers working with jobseekers and to refer persons with assistance needs to the relevant institutions. Greece is introducing this year a new digital Individual Action Plan process, which aims to provide enhanced jobseeker needs identification. Finally, Korea has employed various advanced methodologies (including ontology, network analysis and deep learning) to create a tool that recommends and provides information on services tailored to each individual jobseeker, including suitable job openings and training programmes.

Digitalising jobseeker services and measures

In efforts to further digitalise job-search assistance and counselling, many countries are making remote means of counselling and jobseeker engagement a permanent offering following adaptations made during the COVID-19 pandemic. In Denmark, new regulations concerning jobseeker counselling have been introduced. Digital or remote engagements are now an option for jobseekers, but only after they have been unemployed for more than six months. Another example is that of Greece where a dedicated online platform has been put in place, *myOAEDlive*, to facilitate counselling services via teleconferencing means as an alternative to in-person or on-site provision. Through this service, individuals can use interpretation services in a number of foreign languages and Greek sign language. In addition, the platform supports specialised counselling for vulnerable groups facing significant barriers to employment, including people with disabilities, refugees, migrants and young people.

In some countries, more widespread reforms are going hand-in-hand with entrenching digital jobseeker services. In Australia, a new employment services model, *Workforce Australia*, is being implemented during the summer of 2022. This new model will take a "first" approach, seeing digitally literate job ready jobseekers managing their own journey via online self-service tools. Job ready jobseekers who require some skills training will enter the "digital plus" stream to receive these additional measures, with those jobseekers facing significant barriers to work receiving support from employment services providers via the enhanced services stream (Department of Education, 2021[8]).

Many countries continue to make efforts to increase digital and remote learning options, including via external training providers. In doing this, the Greek PES has developed partnerships with international technology and online learning companies (including Google, Coursera, Cisco, Amazon and Microsoft) to provide high quality digital upskilling to jobseekers; an approach taken by many other PES during past years.

Matching labour supply and demand

Due to the nature of tools and processes used to promote job matching, advancements here lend themselves well to the application of AI or other advanced techniques. More than two-in-five countries are engaging in developments using AI or other advanced tools to support job matching. The Chilean PES,

Bolsa Nacional de Empleo, has adopted AI and modelling techniques to improve the matching of jobseekers and employers. Similarly, Korea has a tool that matches job vacancies with suitable jobseekers using a DeepFM[1] model based on vocational skills. Mexico created a new job-search website, imbedded with AI for augmented employment opportunities.

A new tool by the PES of Flanders (Belgium) *Talent API* employs AI to improve the job-search process by matching jobseekers with vacancies. The tool takes into account jobseekers' characteristics (location, skills, experience), synonyms in vacancies (to provide a wider range of suggested vacancies, by looking for similar jobs under different titles) and jobseeker browsing patterns on the VDAB (Flanders PES) website to identify vacancies similar to those they have already looked at. This gives PES counsellors additional information and insights upon which they can base the guidance and assistance they give to jobseekers (Flemish Parliament, 2021[9]).

Countries are also increasingly adopting tools to identify skills gaps in the labour market. Denmark launched a skills tool in December 2020 that identifies, through text analysis of vacancy postings, which skills are currently in demand by employers, helping employment counsellors to advise jobseekers on job search, training courses and enrolment into education system (Westh Wiencken Vizel and Opstrup Hansen, 2021[10]). In Portugal, work is underway to fully integrate the use of ESCO (European Skills, Competences and Occupations) classification into the PES IT system, so as to improve the identification and addressing of skills deficits among jobseekers.

AI can help jobseekers and employers to better assess the skills, competencies and abilities that they possess and need, respectively. For example, the recently launched "Job Market Finland" service includes smart tools that provide users with various suggestions to help them refine and streamline their jobseeker profile or vacancy description (Vänskä, 2020[11]; Niittylä, 2020[12]; Niittylä, 2021[13]). The tool analyses information provided by the user (employer or jobseeker) and detailed taxonomies describing the job tasks and skills requirements associated with each occupation to make suggestions for suitable jobs.

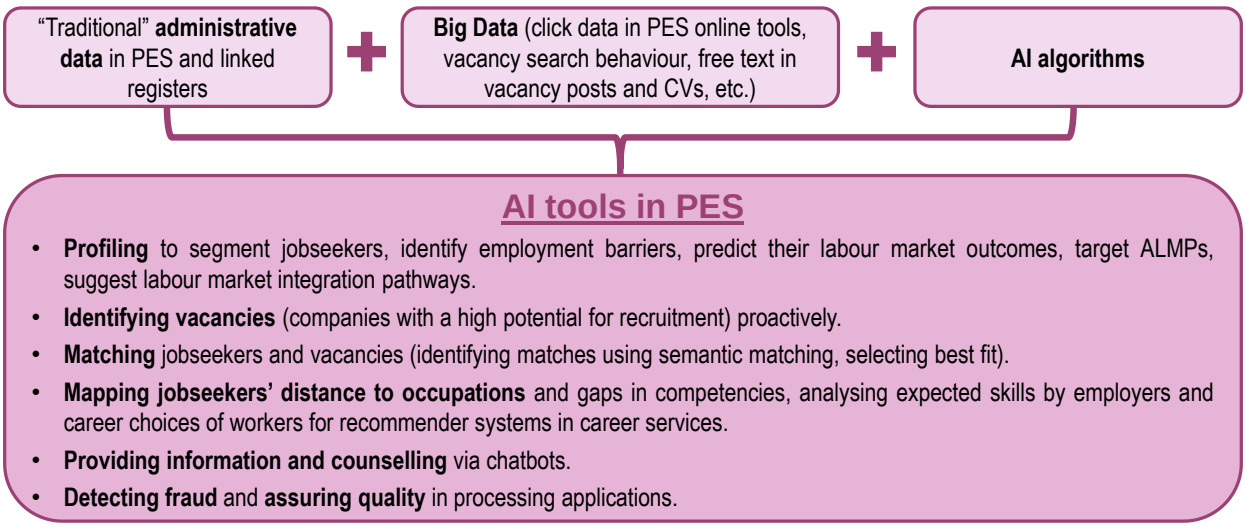
PES are also improving the identification of vacancies and outreach to employers via digitalisation, as well as digitalise their dedicated services for employers. For example, the Chilean PES co-operates with private job search portals to improve vacancy identification. In Japan, an online employer portal allows employers to register and create their own employment referral page where they can post and edit vacancy information, as well as accept and respond to applications from jobseekers. This service is being further expanded in 2022 to include additional features, including functionality to enable employers to directly contact jobseekers to request for their application. In Greece, resources for employers have been bolstered via the enhancement of the dedicated service unit for medium and large enterprises. *DYPA*, the Greek PES (formerly OAED), is developing a new methodology for its employer counsellors focusing on business needs analysis and aiming at providing SMEs with suitable employees. In addition, employers can now engage with the service and receive counselling via teleconferencing, supported by the *myOAEDlive* e-platform. The forthcoming *Workforce Australia* reform will also contain an employer dimension, providing a simplified recruitment services to employers, including via improved matching, shortlisting and dynamic servicing based on workforce needs.

Developing well-performing AI tools in PES

Powering existing or new digital tools by AI algorithms has the potential to further increase the utility of digital infrastructure in providing ALMPs. Thus, such technology has uses across PES activities, from identifying jobseeker needs and targeting support to administrative processes in PES (Figure 3).

[1] Deep factorisation machines (DeepFM) combine factorisation machines and deep machine learning.

Figure 3. AI has the potential to improve ALMP provision across PES activities



Note: AI – artificial intelligence, ALMP – active labour market policy, PES – public (and private) employment services.

AI tools hold the promise of making better use of available data, in a more timely way. Thanks to their dynamic features (e.g. machine learning techniques), AI tools can evolve autonomously over time as they continuously learn from their interactions with users or the new data they gather. Moreover, they can use a broader range of data. Whereas standard algorithms rely on structured data from administrative sources (e.g. jobseeker registration data, social security records, income tax records) or jobseekers' surveys, AI algorithms can also use unstructured data (and Big Data more generally), such as free text written by the employer in a vacancy description or jobseeker's behaviour in job search via online tools, by converting them into structured data. Lastly, AI algorithms draw on more advanced optimisation techniques to make predictions or suggestions, which may improve their accuracy.

At the same time, the use of AI for delivering employment services involves risks (Salvi Del Pero, Vourch and Wyckoff, forthcoming[14]). Some are neither specific to AI nor new, but relate to any analytical tools aimed at making predictions or supporting decision-making. Poor-quality data will result in poor outcomes, performance of these tools is much better for an average individual than for people belonging to marginal groups, and data protection issues are critical as these tools process sensitive personal data. Moreover, even if these tools perform well on average, these are tools only, which lack the soft skills needed to correctly understand people facing particularly difficult situations. And when a wrong decision or action is taken based on a misleading suggestion made by an algorithm, there is still great legal uncertainty as to who is to be held accountable (the developer vs. the user of the algorithm) for the harm this may cause. For example, a jobseeker profiling tool *Powiatowe Urzędy Pracy* launched in Poland in 2012, received a lot of critique from the PES staff and clients. It was perceived to be non-transparent, unfair and potentially discriminating some groups on the labour market, and was finally ruled to be unconstitutional by the Constitutional Tribunal and scrapped in 2019 (European Commission, Joint Research Centre, 2020[15]). An AI tool *Online Compliance Intervention* (known as the *Robodebt scheme*) was adopted in Australia in 2016 for automatic debt assessment and recovery of welfare benefits, but received a vast backlash due to the concerns of lawfulness as well as false and incorrect debt notices, and was thus abandoned in 2020 (Henriques-Gomes, 2022[16]).

More specific to AI tools is the fact they require constant monitoring: although they can be designed to be self-improving over time, the opposite might also occur and the tool may for example develop systematic biases. A second and somewhat related specificity of AI tools relates to the complex data-mining techniques they often rely on, which can make their outcomes difficult to explain. AI has also given rise to

a renewed debate on personal data protection, which finds its roots in the fact that AI algorithms sometimes use unstructured data and lack transparency in the way they proceed to do so. While less advanced technologies, such as standard statistical profiling models (OECD, 2018[17]) may also lack explainability and transparency, AI technologies tend to exacerbate these concerns. Summing up, the use of AI tools requires a careful approach, with safeguarding measures to guarantee the added value of such tools for PES staff and customers, all the more so as AI tools can be costly to develop and maintain.

Policy makers have an important role to play in ensuring the development and use of trustworthy AI technologies that deliver reliable, explainable and fair outcomes. National regulations on data protection and anti-discrimination laws already address some of the issues raised by AI, but more should be done to promote a safe and responsible use of algorithms in general – and of AI algorithms in particular (Salvi Del Pero, Vourch and Wyckoff, forthcoming[14]). The OECD Recommendation on AI provides a comprehensive roadmap in this respect (OECD, 2019[18]). Some PES actors are also taking a proactive approach, like the French PES that recently launched its own "Charter for an ethical use of AI" (Pôle Emploi, 2022[19]).

Importance of evaluating digital tools

Evidence-informed policy making requires systematic and rigorous monitoring and evaluation across measures, services, approaches and tools that PES use to support jobseekers into good jobs and employers meet their needs for labour. Monitoring and evaluation of digital tools is necessary to understand whether the tools indeed perform as envisioned, and whether their use leads to more efficient and effective provision of ALMPs. As significant progress has taken place during the past years regarding applications and user interfaces for jobseekers and employers, as well as back-office infrastructure for the PES staff and external service providers, the evaluation of the digital infrastructure is needed more than ever before.

The monitoring and evaluation activities in PES to adopt new IT tools focus generally on experimenting (to find the appropriate technical solution), testing and piloting (to fix bugs, but also enhance user experience), collecting user satisfaction and feedback data via surveys, and monitoring use and logging after adoption. For example, the French PES (*Pôle emploi*) uses the incubator methodology to develop and deploy new digital tools (Mogollon, 2021[20]). This approach aims to ensure that the new technologies are useful (bring added value) and user-friendly, as well as sustainably deployed. The incubation methodology follows a time-boxed, incremental and value driven approach. This means that the adoption process has clear stages: exploring (identifying the problem and potential solutions), experimenting (validating the most appropriate solution), launching (initially a beta version for fine-tuning), scaling up, and finally assuring continuous improvement and growth. Throughout the different stages of the incubation methodology, there is a focus on identifying and monitoring added value, as well as finding ways to improve the digital tool.

Monitoring take-up and user feedback is critical to analyse and improve the performance of a digital tool, but this information does not fully answer the question of whether the investments in it paid off for the labour market stakeholders. Counterfactual impact evaluations (CIEs) are necessary to establish whether a specific digital tool helps to provide more effective support to jobseekers and employers. The key aim of CIEs is to construct a comparison group not being supported by the tool that is able to credibly establish a causal link between an intervention (support via the tool) and labour market outcomes. This comparison group is used to provide an estimate of the counterfactual: "What outcomes would people have obtained if not supported by this specific digital tool?". CIEs need to be accompanied by process evaluations to assess whether the tool has been imbedded in the PES service provision processes as intended, and cost-benefit or cost-effectiveness analyses to assess whether the tool generates net benefits (OECD, 2020[21]). In some cases of digitalisation (such as more general changes in the PES operational IT system or data management), only the latter types of evaluations are feasible, as the main aim of the changes may be PES efficiency rather than effectiveness, and an evaluation requiring a construction of a comparison group would not be applicable.

While systematic and rigorous CIEs of ALMPs are increasingly common, thorough evaluations are rare regarding the effectiveness of the digital tools to support jobseekers find good employment and employers to meet their needs for skills. For example, the OECD and the European Commission (Directorate General for Structural Reform Support)[2] are currently assisting the Spanish PES (SEPE) to rigorously evaluate a digital tool that has been developed to support counsellors in employment offices to provide individualised advice on jobs search and training (OECD, 2021[22]). The evaluation uses a randomised controlled trial (RCT) design, which is the most reliable way to accurately measure the effect of an intervention. Although designing and setting up an RCT can require considerable efforts to randomly assign individuals into receiving the intervention and the comparison group, the subsequent measuring of the differences in the labour market outcomes between the two groups is relatively straightforward.

Furthermore, digitalisation itself is key to support knowledge generation by enabling the collection of digital data on PES services and labour market information more generally, and to process the data to guide policy making and implementation. Advancements in digital technology have increased the level of automation in knowledge generation and made this knowledge more easily accessible beyond analysts and statisticians. The use of (computational) statistics software and technologies to analyse Big Data can enable knowledge generation beyond monitoring statistics, for example, to indicate causal links and to allow the use of unstructured data in the analysis. A recent good example is the automation of ALMP impact evaluations by the Estonian PES, using statistical computing software and a Business Intelligence tool to evaluate and visualise the labour market effects of various labour market training programmes, employment incentives and work-related rehabilitation schemes based on near-live data in their Data Warehouse and used by the PES management (Leetmaa, 2022[23]). Automatically generated reports evaluating the impact of ALMPs in the Slovak Republic are publicly available since early 2022. They are developed externally from the Slovak PES and are linked to static data from the PES in addition to data from the Labour Market Policy Database administrated by the European Commission (APVV, 2022[24]). A pioneer in (semi-)automated ALMP impact evaluations and visualisation is the German PES, which has adopted a dedicated tool called TrEffeR since although the process is not fully automated but re-launched twice a year (Büttner, Schewe and Stephan, 2015[25]; Schewe, 2017[26]).

Conclusions

Spurred on by the COVID-19 pandemic, PES across the OECD are accelerating their digitalisation journey, adopting digital – including AI – tools across all aspects of operations and services. These advancements are wide-ranging and seek to improve the effectiveness and efficiency of the PES in connecting people with jobs.

As with non-digital changes to labour market policies, digital advancements also require rigorous monitoring and evaluation to ensure they are achieving the desired benefits. Therefore, monitoring and evaluation frameworks should be a required component in the development and implementation of digital initiatives.

In treading a more digitalised path, it is crucially important that PES ensure that nobody is left behind. This requires awareness and understanding of the needs and situation of individual jobseekers to ensure that allowances are made and alternatives are put in place for individuals without digital skills or the means for accessing digital or online services, and for other vulnerable groups (such as some individuals with disabilities) for whom digital approaches may not be an appropriate means of engagement and service delivery.

[2] The support is provided within the framework of the project "Implementing a new approach to the management of statistical and analytical information in the Spanish labour and social security administration", building on a previous project that mapped the systems and processes to generate evidence, proposed a new holistic approach for knowledge generation and an Impact Evaluation Framework.

References

Accenture (2021), *Ask Larry: AI Virtual Assistant for Jobless Claims*, Accenture Case Study, https://www.accenture.com/us-en/case-studies/public-service/twc-unemployment-ai. [4]

APVV (2022), *Štúdie kvantifikujúce dopad nástrojov aktívnej politiky trhu práce*, http://www.lmevidence.sav.sk/?page_id=270. [24]

Büttner, T., T. Schewe and G. Stephan (2015), "The effectiveness of active labor market policy instruments in Germany", *IAB Brief Report*, Vol. 8, http://doku.iab.de/kurzber/2015/kb0815_englisch.pdf. [25]

Department of Education, S. (2021), *New Employment Services Model*, https://www.dese.gov.au/new-employment-services-model/resources/new-employment-services-model. [8]

European Commission, Joint Research Centre (2020), *AI watch, artificial intelligence in public services: overview of the use and impact of AI in public services in the EU*, Publications Office, https://data.europa.eu/doi/10.2760/039619. [15]

Flemish Parliament (2021), *Written Question to the Flemish Minister for Economy, Innovation, Work, Social economy and Agriculture*, https://docs.vlaamsparlement.be/pfile?id=1738998. [9]

Henriques-Gomes, L. (2022), *A failure as shameful as robodebt leaves questions only a royal commission can examine*, https://www.theguardian.com/australia-news/2022/may/14/a-failure-as-shameful-as-robodebt-leaves-questions-only-a-royal-commission-can-examine. [16]

Leetmaa, R. (2022), *Applying an automated tool for impact evaluation of active labour market measures – MALLE*. [23]

Leinuste, K. (2022), "Decision Support Tool - OTT"*, Conference proceedings*. [6]

Leinuste, K. (2021), *Decision support tool „OTT" for employment counsellors in the Estonian PES*, OECD, https://www.oecd.org/els/emp/PES-Digital-Oct2021-Estonia.pdf. [5]

Mogollon, M. (2021), *Pôle emploi. Incubator methodology*, http://www.oecd.org/els/emp/PES-Digital-Oct2021-France.pdf. [20]

NASCIO, CDG and IBM (2021), *AI Meets the Moment: How a pandemic has shaped AI adoption in state government and what it means for the future*, https://www.nascio.org/wp-content/uploads/2021/10/NASCIO-CDG-IBM-AI-Meets-the-Moment-2021.pdf. [3]

Niittylä, H. (2021), *Using AI for jobseeking*, Job Market Finland - Current issues, https://kokeile.tyomarkkinatori.fi/en/blogit/vieraskyna-niittyla-tekoalyn-hyodyntaminen. [13]

Niittylä, H. (2020), *Utilising artificial intelligence in the application process for ESCO competence*, Job Market Finland - Current issues, https://kokeile.tyomarkkinatori.fi/en/blogit/Heikki-Niittyl%C3%A4. [12]

OECD (2022), *Impact Evaluation of Vocational Training and Employment Subsidies for the Unemployed in Lithuania*, Connecting People with Jobs, OECD Publishing, Paris, https://doi.org/10.1787/c22d68b3-en. [7]

OECD (2021), *Impact evaluation of Send@ - a digital tool for PES counsellors in Spain*, https://www.oecd.org/els/emp/dg-reform-spain-digital-tool-for-pes-counsellors.htm. [22]

OECD (2021), *OECD Employment Outlook 2021: Navigating the COVID-19 Crisis and Recovery*, OECD Publishing, Paris, https://doi.org/10.1787/5a700c4b-en. [1]

OECD (2020), "Impact evaluation of labour market policies through the use of linked administrative data", OECD, Paris, https://www.oecd.org/els/emp/Impact_evaluation_of_LMP.pdf. [21]

OECD (2019), *Recommendation of the Council on Artificial Intelligence*, OECD/LEGAL/0449, https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449. [18]

OECD (2018), "Profiling tools for early identification of jobseekers who need extra support", *Policy Brief on Activation Policies*, OECD, Paris, https://www.oecd.org/els/emp/OECD-Profiling-policy-brief-DEC-18.pdf. [17]

OECD (forthcoming), *OECD Employment Outlook 2022: Building Back More Inclusive Labour Markets*, OECD Publishing, Paris. [2]

Pôle Emploi (2022), *Pôle emploi se dote d'une charte pour une utilisation éthique de l'intelligence artificielle*, Communiqué de presse, https://www.pole-emploi.org/accueil/communiques/pole-emploi-se-dote-dune-charte-pour-une-utilisation-ethique-de-lintelligence-artificielle.html?type=article. [19]

Salvi Del Pero, A., A. Vourch and P. Wyckoff (forthcoming), "Using AI in the workplace: what are the main ethical issues?", *OECD Social, Employment and Migration Working Papers*, OECD Publishing, Paris. [14]

Schewe, T. (2017), *TrEffeR (Treatment Effects and Prediction)*, EC, https://ec.europa.eu/social/BlobServlet?docId=18219&langId=en. [26]

Vänskä, M. (2020), *The Good AI*, Job Market Finland - Current issues, https://kokeile.tyomarkkinatori.fi/en/blogit/hyva-tekoaly. [11]

Westh Wiencken Vizel, D. and E. Opstrup Hansen (2021), *The skills tool*, OECD, http://www.oecd.org/els/emp/PES-Digital-Oct2021-Denmark.pdf. [10]

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