Technology as matchmaker

Strategic foresight – *driver 2*

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Definition

Technological advances have improved the availability of labour market information (LMI) delivered through a range of digital platforms and programmes. Artificial intelligence (AI) contributes to improving data quality and analysis, and digitalisation facilitates the accessibility and user-friendliness of information provision. This, in turn, has significantly refined the matching between jobseekers and potential employers, allowing the identification of highly demanded skills and the means to acquire them via LMI websites. These websites have allowed jobseekers – and those supporting them – to identify the skills they need to find a job or progress in a job.

Beyond information websites, digitalisation has led to the development of automated matching platforms. Such platforms streamline the job-seeking process as regards comparing individuals' job preferences and skills with requirements mentioned in job vacancies, with the aim to improve efficiency and precision of the job-matching process.

Technology also increasingly helps overcoming language barriers in international recruitment. Automated translations' quality is improving, and respective tools can be used both for onsite/physical advice and information provision as well as for written materials (such as websites, leaflets, e-mail exchanges).

Furthermore, technical solutions have been developed to support traditional services in the matchmaking process, such as online recruitment fairs, digital systems to arrange appointments (between the jobseeker or employer and the adviser, or between the employer and the candidate).

Developments to date

Information is the key in aligning employer needs with jobseeker aspirations. Concerns persist regarding the efficiency and effectiveness of the job matching process. European governments have invested significantly in initiatives aimed at enhancing this process. These initiatives include: (i) improved labour market information collection to facilitate better matching by refining data accuracy and relevance (e.g. collecting data from online vacancies); (ii) the use of digital platforms for information dissemination ensuring widespread accessibility and user-friendly interfaces; and (iii) the implementation of sophisticated algorithms, sometimes integrating artificial intelligence to enhance personalisation and precision in job matching.

Enhancing the provision of information, advice and guidance (IAG) is central to addressing information asymmetries. For instance, jobseekers often lack comprehensive information about available positions, potentially leading to missed opportunities (LinkedIn, 2022). Employers face similar challenges, with limited insight into a candidate's skills and attributes, often based solely on application forms or interviews (Mourshed, 2012). The failure of employers and jobseekers to effectively connect is a notable concern (Sinclair, 2022). Effective IAG, possibly through standardised job application forms or curricula vitae linked to uniform skills and qualifications recording systems, can mitigate these information gaps. At the European level, initiatives such as the EURES portal, Europass, processes for skills and qualifications comparison across countries, and enhanced labour market intelligence (e.g., Cedefop's Skills OVATE) contribute to the improvement of IAG.

Similarly, Member States have launched various initiatives to enhance IAG provision to improve the job matching process. For instance, workshops on effective job search strategies, such as those organised by the French Employment Agency (Pôle Emploi), offer practical insights to jobseekers. Moreover, dedicated career counselling networks like the Irish 'Seetec' are increasingly common in providing employability and skills programmes. Modern technologies provide the opportunity of making such activities better accessible, e.g. through conducting them in online/hybrid format or by recording workshops and trainings and making them available on websites.

The European Commission (2023) noted that technology has ushered in a more person-centred approach to employment services. This trend is notably exemplified by initiatives in Germany and Greece. In Germany, the Public Employment Service (PES) has implemented the 'New Plan,' a comprehensive tool for vocational orientation designed to address fundamental labour market changes. This tool, introduced in 2022, aims to assist individuals in navigating demographic shifts, digitalisation, technological transformations, and ecological changes. The New Plan incorporates online and face-to-face professional guidance and career counselling, alleviating challenges arising from information overload on the internet. Users can assess their talents, receive career change ideas, and explore development opportunities. The tool supports both self-service use and face-to-face counselling sessions.

In Greece, the Public Employment Service (DYPA) launched 'My DYPA Live' in December 2020, an online platform offering counselling services in 14 languages and sign language. This initiative creates a nationwide virtual network of 75 counsellors who work remotely to provide comprehensive support to jobseekers and employers. My DYPA Live goes beyond counselling by offering training, team-building opportunities, and follow-up meetings with counsellors. Notably, the platform has significantly increased accessibility, with 88% of employers and 87% of jobseekers expressing satisfaction with services in 2022. The online service is complemented by a nationwide map of career opportunities, enhancing labour market knowledge, and expanding the range of advice available to jobseekers (European Commission, 2023).

The trend towards self-service in job matching is also evident. Customers are accessing these services through user-friendly online platforms, enabling jobseekers to autonomously search for employment details, skill requirements, and opportunities (Bimrose, Kettunen and Goddard, 2014). Furthermore, these services are increasingly becoming self-updating, thanks to machine learning and AI technologies that allow for dynamic, automatically updated services based on user interactions. Sweden exemplifies a robust approach in its Public Employment Service (PES) customer service strategy. Intending to develop a fully self-service journey for over 90% of online-registered jobseekers, Sweden's strategy capitalises on synergies with the 98% of employers who place their vacancies online with the PES. To overcome challenges in managing innovation and integrating new delivery systems while maintaining legacy processes, the Swedish PES identified impediments that hindered a seamless automated customer journey. As of 2023, 10% of jobseekers with a clearly defined job search plan for the subsequent 90 days are immediately directed to the self-service channel, while others engage in remote planning meetings with a PES counsellor. For areas with an AI profiling tool, AI assessments guide employment integration discussions. Jobseekers are then directed to manual pathways based on assessed distance from the labour market or a self-service pathway for the most employable segment capable of self-management (European Commission, 2023).

Despite the transformative potential of AI in service delivery, its adoption among European Public Employment Services (PES) remains limited. A survey of European PES Network members indicates that only 12% use AI for matching purposes (European Commission and Pieterson, 2020). However, 76% plan to adopt AI for matching in the future, suggesting significant growth potential in this area.

Technological advances have significantly enhanced labour market data quality, coverage, analysis, and dissemination. These advances have expanded the range of information available to match jobseekers and employers looking for labour. A consequence of this is that the job matching market becomes more fragmented. There are more suppliers of the services potentially in competition with PES. There are now a range of job platforms that look to supply – almost on a just-in-time basis – labour and skills to employers sometimes on a short-term basis (and sometimes on a global basis). Online job portals such as Monster, CareerBuilder, LinkedIn and Indeed, have changed the employment process. While they have streamlined job discovery and application processes, they have also introduced challenges, including significant filtering and data processing costs for companies due to high volumes of applications (McGrew, 2018).

Additionally, the fragmentation of the market might not serve all jobseekers equally. There will be those who lack access to online resources (either physical access through an IT device or the ability to use that device). This may justify why PES have become increasingly focused on supporting those who are most difficult to assist (Larsen and Vesan, 2011).

Technological advances, however, may also filter out candidates, particularly those who are most vulnerable. By removing the jobseekers whose application forms or CVs fail to include information on certain attributes, experiences, skills, or qualifications, Automated Applicant Tracking Systems (ATS) wield a double-edged sword (Fuller et al., 2021). These systems, powered by AI, operate to identify a limited number of candidates closely aligned with specified criteria for a given position. In doing so, however, they risk excluding many credible candidates whom the system judges as marginally less qualified than those who advance in the process. The Recruitment Management Systems (RMS) and ATS are engineered to minimise time and cost in finding job candidates, prioritising efficiency over broadening hiring opportunities. This focus may inadvertently sideline individuals with unique and valuable skills (Fuller et al., 2021).

Expanding on the challenges posed by technology in candidate filtering, a comparable impact emerges in career advisory services. The deployment of the Instant Feedback system in career advice mirrors the efficiency-focused nature of ATS. As advisers actively engaged in its design, it evolved positively, enabling more personalised support for jobseekers. However, ethical concerns persist (e.g.: recruitment biases), paralleling those in candidate filtration, emphasising the need for responsible design and worker involvement in technology-driven changes in hiring practices and career advisory services (Eurofound, 2023). This report also emphasises the need to ensure that digital technologies are designed and implemented in compliance with requirements set out in the GDPR and that workers' rights to privacy and data protection are respected in the context of new technologies.

Platform work has emerged as another form of matching of supply and demand on the labour market. According to JRC (2020), platform work is a growing phenomenon in Europe, with an estimated 11% of the adult population having used a digital labour platform to find work. Noticeably, while platform work has the potential to boost participation in the labour market through better matching procedures, it also

raises concerns about the lack of regulation and the lowering of the quality of employment. Nevertheless, survey data demonstrate that the scale of platform work has hit a plateau in Europe. While platform work has gained attention, it remains a small portion of the workforce.

Despite these advancements, challenges persist. The impersonal and inflexible nature of digital matching services (Florea and Badea, 2013), coupled with the digital divide affecting economically disadvantaged groups (Lancaster, 2003), raise concerns. Additionally, the potential sense of alienation among employees less familiar with technology (Boundarouk, 2009) intersects with the effectiveness of technology as a matchmaker, as individuals less versed in digital interfaces may find themselves marginalised in the evolving job market.

It is apparent that the digital platforms potentially capture much information on the personal characteristics of individuals which can be linked to, for example, their job searchers. This raises issues regarding the way in which data are stored, their accuracy, who has access to them, and the right to have information deleted (cf. the stipulations set out in the General Data Protection Regulation, GDPR). This imposes a necessary constraint on the collection and processing of data for whatever purpose.

Future perspectives

The future trend in technology as a matchmaker, as suggested by the European Commission (2023), involves a strategic vision for Public Employment Services (PES) driven by the need to expand outreach to vulnerable citizens and enhance services through the utilisation of AI and Big Data. The trend suggests a move towards innovative services that optimise benefits and elevate the role of PES in connecting jobseekers with employment opportunities, both within Europe and globally. The emphasis is on leveraging advanced technologies to improve the effectiveness and reach of matchmaking services.

AI is instrumental in designing individualised interventions in several PES. Three prominent trends are shaping the future, as highlighted by the European Commission (2023):

- holistic customer-centric services: Actiris, the Brussels Region PES, envisions harnessing AI and customer data by 2030 to deliver a customer-centric service strategy. This involves profiling and segmenting jobseekers, aligning with AI's capability to optimise job descriptions and CVs and enhancing the inclusivity of services.
- automated PES delivery: The Dutch PES employs AI to detect welfare fraud and tailor online services to individual clients, mirroring the trend of personalised interventions. In Belgian-Flanders, the VDAB's auto-matching system aligns with AI's ability to match jobseekers' profiles with vacancy descriptions, identify skills gaps, and suggest relevant training, contributing to more individualised support.
- preventing digital exclusion: Sweden's PES, while pursuing a digitally driven self-service model, recognises the importance of inclusivity, reflecting the need for AI to design interventions accessible to all.

These examples emphasise the integral role of AI in tailoring interventions to the specific needs of jobseekers in the evolving landscape of PES.

Beyond PES, AI has the potential to significantly enhance the various stages of the job-matching process, according to the OECD (2023). This includes the following.

- Initially, AI can optimise job descriptions and CVs, aiding human resources in both private and public employment services. It can assist in refining job descriptions by identifying essential skills and competencies and avoiding language that may deter certain groups, such as women and minorities.
- In screening and shortlisting, AI reduces the time spent on CV comparison, background checks, and additional assessments. Approximately 32% of recruiters use candidate matching software, which leverages machine learning for automated CV screening (Todorov, 2023). For private and public employment services, chatbots are increasingly used to check candidate eligibility, thus streamlining the screening process and prioritising candidate engagement.
- During interviews, AI can enhance the quality of candidate assessments through analysing factors such as word choice, tone, eye contact, mood, and facial expressions. Post-interview, AI can help in aligning expectation and fine-tuning job offers (Bogen and Rieke, 2018). However, AI has been shown to have low accuracy and low reliability in this context (Jaser, 2023).
- AI also simplifies administrative tasks through the matching process, such as organising interviews, communication and providing feedback. With 40% of HR functions in international companies currently using AI applications (Charlier and Kloppenburg, 2017) and 88% of talent acquisition professionals employing AI/Big Data in recruitment (Korn Ferry, 2018), its impact on efficiency and cost saving is significant.

Looking forward, the increasing adoption of AI in current practices suggests a growing trend. As technology continues to advance, expectations include further integration and refinement of AI tools in the recruitment process. The pace of this evolution is contingent on ongoing technological developments.

Technological advancements also bring broader benefits. They enable recruiters to access a better and more diverse candidate pool, improved data quality for decision-makers, enhance candidates' experience, improve employer perception and introduce objectivity in the matching process by reducing human bias (White, 2021).

The adoption of these technologies is gradual, with barriers and risks. Currently, AI use in recruitment remains limited (OECD, 2023). Challenges include a lack of digital and analytical skills among recruitment professionals and PES staff (Giermindl et al., 2021; Dahlbom et al., 2020). Accenture (2015) reported that while 80% of PES staff recognise the benefits of analytics, they lack the resources for effective implementation. Only 8% of companies consider their HR analytics capabilities (statistical skills, team capabilities in visualisation and communication of results) as 'strong' (Minbaeva, 2018). Additionally, despite recruiters not perceiving AI as a job threat (Lisa and Talla Simo, 2021), there is potential resistance to technology adoption from management and staff (Minbaeva, 2018). One primary concern is the reliability of AI tools in recruitment (Jaser, 2023). Many individuals still prefer human oversight in the recruitment process, questioning the dependability of AI. However, attitudes tend to shift as AI demonstrates greater accuracy in application (Langer and Landers, 2021).

A significant barrier is the perception of automated recruitment processes. A considerable number of Americans (76%) expressed reluctance to apply for positions that used a computer programme for making hiring decisions. (OECD, 2023). This is further underscored by an OECD panel finding that while 52% of participants are comfortable with technology-assisted shortlisting, only 26% approve AI replacing human-led interviews (OECD, 2023). These findings highlight the necessity of a 'Tech and Touch' approach, which combines technological efficiency with human empathy (OECD, 2021).

Another concern involves the infringement of human rights, encompassing issues of dehumanisation, privacy, and fairness, as well as challenges surrounding transparency in AI applications. These concerns could hinder the adoption of recent technologies in the matching process (OECD, 2023). Furthermore, technological bias, resulting from historical discriminatory data records, raises significant ethical issues (Broecke, 2022). Such bias could perpetuate existing inequalities and necessitates careful consideration and mitigation strategies in the deployment of AI in employment matching.

Hypotheses about the future

This analysis outlines the anticipated trajectory of technological evolution and its prospective influence on career guidance, job matching, and employment services through to 2030. The potential outcomes present the following hypotheses.

- In the first hypothesis, developments follow their current trajectory. The services provided by the PES are augmented by that from private providers except that the information used in matching people to jobs is increasingly tailored. Here the PES are still a central and major provider of matching services.
- In the second hypothesis, private providers are able to more readily develop technology driven matching services that allow them to capture more of the jobseeker market such that the PES become much more oriented to assisting marginalised groups.
- In the third hypothesis, job seeking is transformed by digital platforms, such that self-service becomes the norm with less personal contact with guidance professionals.

H1: Dominance of PES services, supported by technological solutions

The expectation is that the future will look like the past where the PES provide a range of services augmented by private sector / third sector providers (i.e. recruitment agencies) serving particular segments of the market. The information and services PES and other providers deliver effectively matches people to jobs because new technologies (e.g. matching algorithms) provide the basis for achieving this end.

H2: Prominent role of private service providers

By 2030, the EU will have seen an increase in the number of private players focusing on collecting labour market information and offering matching services to connect jobseekers and employers. Private sector actors have developed substantial capacities to collect and process labour market information and develop and use matching apps/programmes to serve particular segments of the market. This allows them, in aggregate, to capture an increasingly large share of the overall market. PES focus on serving more marginalised groups in the labour market (e.g. low-skilled workers).

H3: Machine dominated self-service provision

By 2030, there will be an increasing number of digital platforms which essentially provide self-service provision to jobseekers. Some of these will be provided by the PES, but there is an increasing number of new players on the market, applying a 'digital business model'. The process of searching for and finding a job becomes increasingly automated with much less of a role for guidance professionals of PES or private providers. Chatbots will be increasingly used to guide individuals and employers through the job seeking / matching process.

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