Connecting People with Jobs

# Modernising Latvia's Public Employment Service through Digitalisation

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# Foreword

Giving people better opportunities to participate in the labour market is a key policy objective in all OECD and EU countries. More and better employment increases disposable income, strengthens economic growth and improves well-being. Well-tailored labour market and social protection policies are a key factor in promoting the creation of high-quality jobs and increasing activity rates. Such policies need to address pressing structural challenges, such as rapid population ageing and evolving skill needs, driven by digitalisation and the green transition. They should also foster social inclusion and mobilise all of society. In addition, labour markets have been buffeted by temporary crises like the COVID-19 pandemic and the cost-of-living crisis brought about by Russia's war of aggression against Ukraine.

People working in some sectors and locations and those with certain qualifications and skills can be more at risk of job loss. These risks are coupled with events over a person's lifetime that can increase unemployment and long-term unemployment risks, such a spell of poor health or changes in family composition and situation. Active labour market policies (ALMPs) and public employment services (PES) will have a major role in the coming years to tackle unemployment risks, support labour relocation and make labour market participation accessible for all. At the same time, digitalisation, including artificial intelligence (AI) and advanced analytics, have enormous potential to improve the efficiency and effectiveness of ALMPs and PES in supporting jobseekers, workers and employers.

The OECD is carrying out a set of reviews of labour market and social protection policies to encourage greater labour market participation and promote better employment opportunities, with a special focus on the most disadvantaged who face the greatest barriers to finding quality jobs. This includes a series of country studies, *Connecting People with Jobs*, which provide an assessment of how well each country's ALMPs and PES help all groups to move into productive and rewarding jobs, and policy recommendations for improving their effectiveness.

This review seeks to support the modernisation of the functioning and delivery of services by Latvia's PES, the State Employment Agency (SEA). The review discusses the SEA's needs for digitalisation and its strategy to guide the modernisation pathway. It also provides a detailed assessment of the SEA's digital infrastructure and key recommendations to fine-tune its operational IT system, develop data analytics capabilities and enhance dedicated digital tools to guide services for jobseekers, people at risk of job loss, and employers, as well as to better match jobseekers and job vacancies. This report on Latvia is the fourteenth country study published in this series. The action was funded by the European Union via the Technical Support Instrument, and implemented by the OECD, in co-operation with the Directorate-General for Structural Reform Support of the European Commission.

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This report is produced in the framework of the project "Modernizing digital systems of the Latvian Public Employment Services" (www.oecd.org/els/emp/latviadigitalpes.htm), which was conducted in the context of DG REFORM's Technical Support Instrument (TSI). The aim of this project carried out by the OECD in co-operation with DG REFORM of the European Commission is to help the MoW and the SEA harness the potential of digitalisation to boost their capacity to provide effective and efficient support to jobseekers, persons at risk of losing their job, and employers.

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# Executive summary

The State Employment Agency (SEA), Latvia's public employment service, plays a crucial role in connecting people with jobs, but tight budget constraints make efficiency a priority. Many public employment services in OECD and EU countries are increasingly harnessing digitalisation to meet the needs of their clients better and more efficiently. This report assesses the SEA's existing digital infrastructure and makes key recommendations for how the SEA could make better use of digital technologies.

Latvia allocates relatively little to active labour market polices (ALMPs) compared to other EU and OECD countries (0.14% of GDP in 2021 compared to 0.45% and 0.53% in the OECD and EU, respectively), as ALMP expenditures rely largely on project-based EU funding. Low levels of resources for ALMPs limit the SEA capacity, resulting in challenges to attract and retain staff due to low wages, a high number of jobseekers per counsellor, and low availability of ALMPs even though previous evaluations of these have shown them to be effective. This low level of resources underlines the importance of the SEA making the most efficient and effective use of them, highlighting the opportunity to harness digitalisation. However, harnessing the potential gains from digitalisation requires up-front investment that can be difficult to resource when funding is stretched.

The SEA recognises that its IT backbone is a key enabler to deliver good services to its clients, and its IT system is indeed able to support most of its current needs, such as registering jobseekers, managing services and measures, registering job vacancies, and matching jobseekers and job vacancies. However, the IT system does not include sufficient data management functionality, particularly in terms of data analytics to support evidence generation, but also in terms of data quality management and data sharing solutions with external parties. In addition, the architecture of the current IT system is not fully future-proof and some practices in the SEA exhibit data and system security concerns.

The SEA has a dedicated tool to profile jobseekers to generate a better understanding of their needs for support, as well as a tool to match jobseekers and job vacancies. While the vacancy matching tool is fully digitalised and largely covers the needs of the SEA counsellors, jobseekers and employers, the jobseeker profiling tool requires manual processing and raises some issues regarding its efficiency, accuracy and usefulness. Digital tools to assist jobseekers in career management are only at a very initial stage in the SEA, the first tool to guide an understanding of jobseekers' abilities being just adopted.

The key policy recommendations emerging from this review include:

- **Adopt a dedicated digitalisation strategy for the SEA.** Develop a dedicated digitalisation strategy that lays out the objectives, principles and frameworks for the SEA's digital transformation clearly and comprehensively. This should cover ensuring sustainable resources for digitalisation, establishing frameworks to maximise the value-added of digital solutions, monitoring and evaluating digital tools, and managing risks associated with such tools.
- **Fine-tune the operational IT system, its security and related practices.** Move to a more modular architecture, introduce network-level segmentation and systematically upgrade outdated software. Implement continuous and systematic processes throughout system security

management, such as in monitoring vulnerabilities, monitoring system access, auditing access rights and risk assessment and management.

- **Introduce a modern data analytics system** involving a data warehouse and a Business Intelligence tool to better meet the knowledge needs of internal and external stakeholders, as well as comply with data protection regulation.
- **Refine the design and implementation of the jobseeker profiling tool.** Refine the objectives and possible use cases of the profiling tool. Integrate the jobseeker profiling tool into the SEA digital infrastructure to use data from external registers automatically, facilitate data inputs from users and retain profiling information for future use. Adopt a modern statistical profiling technique or an AI-based profiling model to improve its accuracy, learning from the best practices of other countries.
- **Introduce a skills profiling tool** to support jobseeker profiling efforts that consists of skills testing modules and generates a better understand of jobseeker skills to provide better job matching and career management services, as well as measures for upskilling and reskilling.
- **Enhance the performance of the job matching tool** to better and faster identify good matches between jobseekers and job vacancies. Move towards a competency-based matching algorithm and consider enhancing it with AI technologies in the future to further facilitate using skills taxonomies, and increase its performance and user-friendliness. Consider supporting the job matching tool with other (advanced) digital solutions to better help employers to fill vacancies for bottleneck occupations and strengthen career management services.
- **Invest in the SEA's digital tools and staff capacity**. In particular, invest in the IT department of the SEA to ensure sufficient capacity to steer the digital transition and manage the projects with the external contractors.
- **Increase the capacity of the ALMP system**. Increase ALMP funding from the national budget to expand the reach of evidence-based ALMPs across the different types of services and measures, such as counselling, training and employment incentives.

# 1 Assessment and recommendations

Latvia's State Employment Agency (SEA) plays a crucial role in connecting people with jobs. However, the SEA faces tight resource constraints, with Latvia spending little on active labour market policies compared to other countries. Modernising the digital infrastructure of the SEA could help it to better meet the needs of jobseekers, people at risk of unemployment and employers. The SEA should develop a clear digitalisation strategy to guide its modernisation pathway, fine-tune its operational IT system especially with respect to cyber security, and develop a modern data analytics system. Learning from other countries, the SEA could additionally increase the effectiveness and efficiency of its specific digital tools, such as those to profile jobseekers and their skills to generate a better understanding of their needs for support, as well as the algorithm to match jobseekers and vacancies to better meet the needs of a changing labour market.

## 1.1. The State Employment Agency has a crucial role to support the Latvian economy and it needs sufficient resources to do so

The labour market in Latvia has improved in recent years with a growing economy translating into wage increases and lower levels of unemployment. Latvia's economy slowed after Russia's war of aggression against Ukraine began, but growth has since resumed, and the inflation rate has fallen considerably since a peak of 22.2% in September 2022 year-on-year to 1.0% in November 2023. The employment rate in the third quarter of 2023 at 71.4% among 15-64 year-olds was still below its level before the COVID-19 pandemic but remains higher that the EU average of 70.4%. Over the medium to longer term an ageing and declining population underscores the importance of supporting the available workforce to sustain growth in the Latvian economy. This challenge requires ensuring that skills supply meets changing skill demands in the context of the digital and green transitions, and enabling an access to good jobs for groups that currently fare worse on the labour market, such as people with disabilities, youth, older workers, women and people living in remote areas.

The State Employment Agency (SEA), Latvia's public employment service, has a crucial role to play in connecting unemployed persons and persons at risk of unemployment with good jobs. However, spending on active labour market policies (ALMPs) in Latvia remains low at 0.14% of GDP in 2021 (compared to 0.45% and 0.53% in the OECD and EU, respectively). Such low spending translates into less capacity at the SEA, with low wages for the SEA staff, a high number of jobseekers per counsellor, and less funds available for measures that can support jobseekers into employment such as training and wage subsidies. Partly due to Latvia relying mostly on project-based funding sources for its ALMPs from the European Union, ALMP participation has fallen in both absolute numbers and relative to the number of unemployed from around 16 700 participants (23% of the registered unemployed) between January 2017 and June 2018, to 7 900 (11.6% of registered unemployed) between July 2020 and December 2022.

With low levels of ALMP spending, it is crucial that the SEA uses its resources as effectively as possible. Digital tools and processes can enable the SEA to be more efficient and effective. In this regard, the SEA could make several improvements, including upgrading its existing IT infrastructure, improving and automating operational processes, modernising existing PES specific tools, such as its jobseeker profiling tool and vacancy matching platform, and introducing new tools such as for skills profiling.

Regardless of improvements in the digital infrastructure of the SEA, Latvia should consider increasing ALMP funding and wage levels in the SEA using its national budget to ensure a sustainable and sufficient reach of ALMPs and improve labour market outcomes for more jobseekers as well as people at risk of job loss. Investments in ALMPs need to be informed by systematic evaluations of effectiveness and cost-effectiveness of ALMPs and the SEA tools and processes.

## 1.2. Digitalisation in the State Employment Agency requires a clear strategy

Different elements of digitalisation are discussed in the SEA's general strategy for 2021-23, listing some of the development needs and recognising IT infrastructure as a key prerequisite to achieve the SEA's objectives and increase the effectiveness, efficiency, accessibility and user-friendliness of its services.

To address the aspirations for modernisation and the related challenges more systematically and comprehensively, the SEA should consider developing a dedicated digitalisation strategy. The digitalisation strategy should lay out the overall objectives and principles for the SEA's digital transformation, helping to prioritise any related investments. It should also provide a key frameworks for the modernisation process, particularly regarding ensuring sustainable financial and human resources for IT developments, maximising the value-added of new and updated digital solutions, and managing the risks associated with digital tools.

To maximise the resources available for the digital transformation, the SEA and the Ministry of Welfare (MoW) need to continue applying for additional project-based resources (e.g. EU funding) and co-operate with other Latvian and international organisations. To maximise the value-added and user experience of digital solutions, the SEA needs to introduce a monitoring and evaluation framework of digital tools, as well as systematic approaches to involve end-users and receive their feedback throughout the development process and after deployment. Lastly, the SEA's digitalisation strategy should establish a framework on how to manage risks concerning ethics, trustworthiness, accountability, transparency, fairness, data protection and system security. It should aim to adopt modern development methodologies and ensure that competitive proposals are received for choosing the development partners for the IT projects.

## 1.3. The operational IT system of the State Employment Agency needs fine-tuning to make it secure, efficient and future-proof

Overall, the IT backbone of the SEA performs adequately its main tasks, such as registering jobseekers, managing services and measures, registering vacancies, and matching jobseekers and vacancies. Also, the high-level architecture of the system generally meets the operative needs of the SEA. Although the SEA does not have an urgent need to fundamentally change or replace its main operational IT system in the near future, some fine-tuning should be carried out, as the system is not fully efficient, modern, and entirely future-proof regarding the potential needs to develop new functionalities. The more concerning challenges of the SEA IT system are related to system and data security and data quality management.

To future-proof the IT system, facilitate development processes, increase system security and enable working with several development partners, the SEA should move to a more modular architecture of the main IT system, above all regarding any new digital solutions. The current "monolithic" set-up of the main operational IT system in the SEA is more likely to break down during upgrading and deploying new features than a more modular system with well-defined interactions among its modules.

The SEA should deploy a modern Application Programming Interface (API) management tool to create an abstraction layer between internal and external systems and thus manage data security risks in data exchange processes. Currently, some of the interfaces for data exchange in the SEA IT system enable direct access to the main operational database, which reveals the database structure to the external parties and creates direct coupling, thus making the maintenance of the SEA operational system harder than necessary and creating system security risks.

To further increase system security (and system performance), the SEA should also introduce network-level segmentation (divide its computer network into smaller parts), update its technology stack regularly, implement a dedicated tool to monitor system performance and security in real-time, limit the access to the SEA production environment and implement comprehensive and frequent testing of vulnerabilities. Additionally, the SEA could consider implementing automatic code scanning to detect known security problems and vulnerabilities, and automatic software deployment to better avoid errors in system updates. Overall, the SEA needs to aim at more continuous systematic processes throughout system security management to enhance monitoring, logging, testing and auditing.

The main operational IT system of the SEA has only limited data quality checks, and data quality issues are mostly managed manually, leading to inefficiencies, possible errors and data security concerns. Yet, data quality affects all aspects of the SEA operations, and therefore the SEA should manage more systematically data quality issues. The SEA needs to adopt an official process to manage data quality issues and a data quality standard to define quality target levels. In addition the SEA should assign clear ownerships of all sets of data in its databases. To increase efficiency in data quality management, the SEA needs to implement system-wide controls over input data and an automated system to analyse data quality, enabling to monitor the data in the system and report any issues detected, as well as potentially automatically fix some types of issues.

## 1.4. Adopting a modern data analytics solution would help the State Employment Agency better meet the needs for evidence-based policy design and implementation

The SEA, in co-operation with the Ministry of Economics, has set up an interactive digital tool to disseminate labour market forecasts – the Labour Market Forecasting Portal. The platform is publicly available and a good source of information covering various indicators for the short-, medium- and long-term. Other than the forecasting platform, the SEA does not use modern data analytics solutions to generate and disseminate statistics and analysis. The statistics team in the SEA is making the best out of the current solution to support evidence-generation, given that it is only able to use limited and inflexible tools to query and process data from a copy of the operational database. In addition, the production of statistics and analysis is mostly a manual process, which is inefficient and error-prone, and does not fully meet the need for data and analytics, and exhibits various data protection concerns.

The SEA needs to adopt a modern solution to meet the needs for statistics, analysis and data internally and of external stakeholders, where key components are a data warehouse and a Business Intelligence (BI) tool. A data warehouse is a central repository containing structured and semi-structured data from one or more data sources, designed to support the needs of data analytics. BI tools facilitate querying, presenting and disseminating data from databases (such as data warehouses) efficiently, flexibly, interactively and tailored to the user needs. As of early 2023, PES systems in 74% of OECD and EU countries had set up a data warehouse to facilitate data analytics, and 76% were using a BI tool to produce statistics and analysis, and support data analytics more generally.

Using a data warehouse for data analytics rather than a copy of the SEA's operational database meets the needs of data analytics better, as the data structure and content in the data warehouse does not need to follow the same administrative logic as in the operational database. Furthermore, the data warehouse would enable the use of additional data sources for analytical purposes, providing the technical possibility to use for example employment and wage data of jobseekers to analyse their labour market pathways after leaving the SEA register. In addition, a data warehouse could potentially contain only anonymised or pseudonymised data, and thus help the SEA better comply with data protection regulation when processing data. Furthermore, adopting a data warehouse would decouple the operational and analytical systems, and thus would not affect each other's performance in case of heavy workloads, and would also provide a secure channel to share data with external partners.

BI tools would enable the SEA statistics department to automate the production and visualisation of all regular statistics, and implement ad hoc queries flexibly. This would also allow other units in the SEA like the management and regional offices to have key information automatically available in an easily comprehensible format that enables visualisations and tailoring to their needs. In addition, a BI tool could be used to disseminate data and statistics in a user-friendly and flexible way externally.

## 1.5. The jobseeker profiling tool needs to be refined to strengthen its reliance on data and evidence

The SEA uses a simple and transparent rules-based jobseeker profiling tool to support counsellors in choosing appropriate services for jobseekers, aiming to provide more intensive service for those further from the labour market. The profiling tool divides jobseekers into three groups based on their proximity to the labour market by counting the number of risk factors each jobseeker has, relying on the information provided by the jobseekers during their first counselling session. The profiling tool's categorisation of jobseekers into three "employability" risk groups is mostly aligned with the intended risk groups as the profiling scores very broadly correspond to different probabilities for long-term unemployment. The

implementation of the jobseeker profiling tool is not fully aligned with service provision, as ALMPs designated for those with medium or low employment prospects are more frequently undertaken by those with high employment prospects. Furthermore, the use of the jobseeker profiling tool has decreased among counsellors in past years.

The SEA should analyse the objective of its jobseeker profiling tool and its implementation to understand its potential use-cases and value-added, and thus increase take-up among counsellors. Investments in the profiling methodology and design would be useful only if the value-added of the profiling results are clear and useful for service provision. For example, a possible approach for the SEA would be to use the results of the profiling tool to push back the initial counsellor meeting for carefully selected groups of clients to better manage the scarce counselling resources of the SEA.

Moreover, the SEA should integrate the jobseeker profiling tool into its digital infrastructure to increase its efficiency and usefulness, and thus encourage its take-up among counsellors. For example, information available on jobseekers from other registers could be feed into the jobseeker profiling tool automatically in addition to subjective, survey-based sources. The SEA should also aim to retain the detailed information on the individual-level risk factors from the profiling tool by administering the profiling questionnaire via a secure online survey (ideally a jobseeker interface integrated into the SEA's online tools), with the individual responses shared with the SEA counsellors (ideally via the counsellor interface).

The SEA should also aim to further increase the accuracy of the jobseeker profiling tool. In the short term, the SEA could revise the profiling questionnaire to incorporate questions that have been scientifically cross-validated via rigorous empirical analyses and assign weights to each of the questions to calculate a profiling score following evaluations or using results from other countries. In the longer term, the SEA should adopt a more sophisticated profiling tool that would provide detailed insights into factors influencing a jobseeker's score and suggest specific actions to enhance a jobseeker's employability through, for example, participation in training. Considering the capacity and budget constraints in the SEA, a profiling tool based on an established statistical technique rather than Artificial Intelligence (AI) technology may be the more feasible approach.

## 1.6. A modular knowledge-based skills profiling tool could better inform support needed by jobseekers

A better understanding of jobseeker skills would better inform service provision to jobseekers to help them in their job search strategy, match them with suitable vacancies, refer to upskilling and reskilling measures, and support them in their career management. The SEA is looking into implementing skills profiling tools to support counsellors to better and more quickly understand their clients, and to help jobseekers gain self-knowledge of their skills and interests, as well as explore ideas for occupations they should seek.

As the accuracy of skills profiling is highly relevant for the SEA to inform training decisions, knowledge-based tests could be part of skills profiling, rather than subjective self-assessments. Also, as it is relevant for the SEA to profile different types of skills, a more modular approach rather than a single test may be more suitable. In this case, jobseekers would take only those tests that are mor relevant for them. Furthermore, the SEA can then develop the skills profiling tool gradually and add new modules assessing different skill areas when the skills profiling tool is updated.

As one feasible possibility, the SEA could consider adopting the OECD's Education and Skills Online to profile the skills of jobseekers, people at risk of job loss and the adult population more generally. The future design of this tool could be integrated into the SEA's processes to understand their clients' needs for support. This could include new modules to cover the key skills needed on the Latvian labour market. For example, the future design of the OECD's Education and Skills Online may include modules on skill use at work, digital skills, and financial literacy amongst others.

## 1.7. Moving towards a more competency-based vacancy matching tool would better meet the changing needs of the Latvian labour market

As one of the key tasks of the SEA is to both support jobseekers find suitable jobs and help employers find the staff they need, the SEA has developed a digital solution to match jobseekers and vacancies that can be used by counsellors in-house, as well as by jobseekers and employers independently on the public platform (Curriculum Vitae and Vacancy Portal, CVVP). The matching algorithm used by the SEA is transparent and straightforward for the different user groups and thus generally caters to their needs, enabling the SEA to mediate around 80% of vacancies available in Latvia.

To further strengthen the performance of the vacancy matching tool and better cater to the changing needs of the labour market, the SEA should aim to increase the competency-based component in its matching algorithm. As the first priority, the SEA could introduce those competencies in the job matching tool that are considered to be of key importance on the Latvian labour market and tested in the new skills profiling tool. It is important to aim at covering the key competencies and skills systematically in the vacancy matching tool to avoid biased and thus unusable matching results. As such, the SEA should link the skills and competencies to be introduced in its vacancy matching algorithm to a skills taxonomy, ideally the ESCO taxonomy (European Union's employment, skills, competences, qualifications and occupations taxonomy).

Enhancing the SEA's job matching tool additionally with AI technology would bring several potential benefits. This would include: strengthening competency-based matching and fully integrating the ESCO taxonomy; performing higher quality and more personalised matches; providing a better overview of possible career choices for jobseekers; and making the tool more intuitive and user-friendly. It would, however, require additional resources and learning from other countries. Therefore, the SEA could aim at this more advanced solution in the long run, aiming to adopt an AI-based job matching tool that uses competencies, jobseeker interests and labour market information to match jobseekers and vacancies. Nevertheless, smaller adaptions to increase the tool performance could be made already in the near term, such as allocating more server capacity to increase the speed of providing matching results, adding key competencies in the matching algorithm, displaying full matches and near matches for the users in a comprehensible way, as well as enhancing user experience within the tool design more generally.

Although not a key priority in the short term, the SEA could consider additional digital solutions in the future to further strengthen its services to jobseekers, people at risk of job loss and employers, particularly in terms of better matching labour demand and supply. Learning from other countries, these solutions could help the SEA to increase the pool of vacancies mediated in its platform (e.g. web scraping technologies), help employers to fill vacancies for bottleneck occupations (e.g. predict hiring needs, assistance in designing job vacancies) and better deliver career management services (e.g. recommender tools for comprehensive career pathways).

## Key policy recommendations

**Develop a digitalisation strategy for the SEA and support it with key frameworks for a sustainable modernisation pathway**

- Develop a dedicated digitalisation strategy that clearly and comprehensively sets out the objectives, principles and frameworks for the SEA's digital transformation.
- Continue to seek additional project-based resources (e.g. EU funding) and mutual learning processes with other Latvian and international organisations to maximise the resources available for the digital transformation.
- Establish mechanism to maximise the value-added and user experience of the SEA's new and updated digital solutions, such as a monitoring and evaluation framework for digital tools and systematic approaches to involve end-users and their feedback throughout the development processes and after deployment.
- Introduce a modern IT development methodology (e.g. DevSecOps) for new development projects to achieve more agile development processes that address system security already in the initial stages.
- Consider possibilities to adjust procurement processes to receive competitive proposals for IT projects and ensure sufficient and flexible external development capacity.

**Fine-tune the operational IT system of the SEA**

- Move to a more modular architecture of the main IT system to facilitate development processes, increase system security and enable working with several development partners.
- Introduce network-level segmentation (divide a computer network into smaller parts) to improve system security and network performance.
- Upgrade outdated software in the technology stack for up-to-date versions before their support (e.g. for security fixes) ends.
- Consider automatic software deployment to avoid errors in system updates, facilitate rolling back in case necessary, and remove the need for developers to access the SEA production environment and thus increase system and data security.
- Deploy a modern Application Programming Interface (API) management tool to create a buffer between internal and external systems and thus manage data security risks in data exchange processes.

**Improve data management practices**

- Define an official process to manage data quality issues. Agree on a data quality standard, including target levels and acceptable variation in data quality, and clearly define ownerships of all sets of data in the SEA's databases.
- Implement system-wide controls over input data that enable a singular point of validation of each data element.
- Implement an automated system to analyse data quality, enabling the monitoring of the data in the system and the reporting of any issues detected, as well as potentially automatically fixing some types of issues.

**Strengthen system security**

- Limit the access to the SEA production environment to only very few administrators in the SEA and log their actions rigorously.
- Test the SEA's systems against the new discovered vulnerabilities more frequently, potentially using automated testing services available on the market.
- Consider implementing automatic code scanning to detect known security problems and vulnerabilities in codes used in the systems, as well as already before these are deployed.
- Implement continuous systematic processes throughout system security management, such as in monitoring vulnerabilities, monitoring system access, auditing access rights and risk management.

**Introduce a data warehouse solution to benefit data analytics**

- Adopt a separate data warehouse for analytical purposes to better fit the data models and content for analytical purposes, bring in additional data sources, comply with data protection regulation and decouple the operational ana analytical systems.
- Consider using the data warehouse solution to make some data securely available to specific user groups, partners or other external stakeholders, without a possibility of leaking data not meant to be shared.

**Automate data analytics using Business Intelligence tools**

- Adopt a Business Intelligence (BI) tool to enable the SEA statistics department to automate the production and visualisation of all regular statistics and implement ad hoc queries flexibly. Make key information available for the SEA management and regional offices in an easily understandable and flexible format, i.e. dashboards.
- Connect the BI tool to the data warehouse solution to access data that are suitable for analytics purposes, not to affect the performance of the operational system, as well as avoid having to make adjustments in the BI tool when changes are implemented in the operational database.

**Refine the design and implementation of the jobseeker profiling tool**

- Use the jobseeker profiling tool to identify jobseekers who are likely to become employed quickly and may not require an immediate meeting with counsellors within the first 30 days of becoming unemployed.
- Feed information from administrative sources automatically into the jobseeker profiling tool in addition to subjective, survey-based sources.
- Retain the detailed information on the individual-level risk factors from the profiling tool by integrating the tool into the SEA digital infrastructure.
- Revise the profiling questionnaire to incorporate questions that have been scientifically cross-validated via rigorous empirical analyses and assign weights to each of the questions to calculate a profiling score following evaluations or using results from other countries.
- In the longer term, aim at adopting a data-driven profiling tool that would provide detailed insights into factors influencing a client's score and suggest specific actions to enhance a client's employability.

**Introduce a skills profiling tool to test key skills relevant on the Latvian labour market**

- Consider implementing skills testing (rather than subjective self-assessment) for those skills for which the accuracy of skills profiling is highly relevant.
- Adopt a modular approach rather than a single test to cover different types of skills in the profiling tool.
- Consider adopting the future version of the OECD's Education and Skills Online to profile the skills of jobseekers, people at risk of job loss and the adult population more generally.

**Enhance the performance of the job matching tool**

- Move gradually towards a more competency-based matching algorithm to better identify good matches between jobseekers and vacancies, starting from key competencies and those tested in the new skills profiling tool and relying on ESCO taxonomy to ensure a systematic approach.
- Consider smaller adaptions to increase the tool performance in the near future, such as allocating more server capacity to increase the speed of providing matching results, adding key competencies in the matching algorithm, displaying full matches and near matches for the users in a comprehensible way, as well as enhancing user experience within the tool design more generally.
- In the long-run, aim at adopting an AI-based job matching tool that uses competencies, jobseeker interests and labour market information to match jobseekers and vacancies.
- Consider supporting the job matching tool with other (advanced) digital solutions in the future to increase the pool of vacancies available for jobseekers, help employers to fill vacancies for bottleneck occupations and better deliver career management services.

**Increase the capacity of the ALMP system**

- Invest in the SEA's digital tools and staff capacity. In particular, invest in the IT department of the SEA to ensure sufficient capacity to steer the digital transition and manage the projects with the external contractors.
- Increase ALMP funding from the national budget to expand the reach of ALMPs and improve labour market outcomes for more jobseekers and people at risk of job loss, and ensure sustainable resources for ALMPs.
- Continue conducting ALMP impact evaluations systematically to ensure effective and efficient ALMP provision and strengthen the business case for increasing ALMP funding and resources for the SEA.

# 2 Recent trends in the Latvian labour market

The purpose of this chapter is to give a brief overview of the Latvian labour market and the role of the State Employment Agency (SEA), the public employment service (PES) of Latvia. The chapter briefly presents the latest labour market trends and highlights challenges that the SEA will need to address going forward. The chapter also discusses spending on active labour market policies (ALMPs) and needs for further investments in the SEA in order to address the labour market needs.

## 2.1. Introduction

To make the best decisions when modernising and digitalising a public employment service (PES), it is critical to understand the environment in which the PES operates, the needs it has, and the resources available to meet these needs. This chapter thus provides a short overview of the Latvian labour market and its challenges, a short discussion of the role of the State Employment Agency (SEA), Latvia's PES, an overview of ALMP spending and participation, and a discussion of recent evaluations of ALMPs in Latvia. This chapter highlights the limited financial resources Latvia has for ALMPs despite facing consistently higher rates of unemployment than the OECD average. Given such limited resources, modernising and digitalising the SEA can be especially important for making the most of the resources that are available.

Section 2.2 highlights how Latvia's strong economic growth over the past decade has supported increasing wages and employment amidst declining, but still above average levels of unemployment. In the near term the labour market is recovering well from the COVID-19 crisis, but workers face challenges of inflation. Over the medium and longer term a rapidly declining and ageing population underscores the importance of making the most of the available workforce. ALMPs have a role to support this demographic transition and to ensure the inclusion of all groups in the labour market.

Section 2.3 discusses the ALMP set up in Latvia. It shows that Latvia's ALMP spending is limited compared to other OECD countries despite higher levels of unemployment than the OECD average. In addition, such funding is often provided on a project basis, as opposed to more secure longer-term funding. However, evaluations of Latvia's ALMPs show that they are effective in supporting people into jobs. Taken together the high demand for ALMPs and the finding that they are effective makes a prima facie business case for greater investment in ALMPs in Latvia.

## 2.2. The Latvian labour market is recovering well post-COVID, but challenges remain

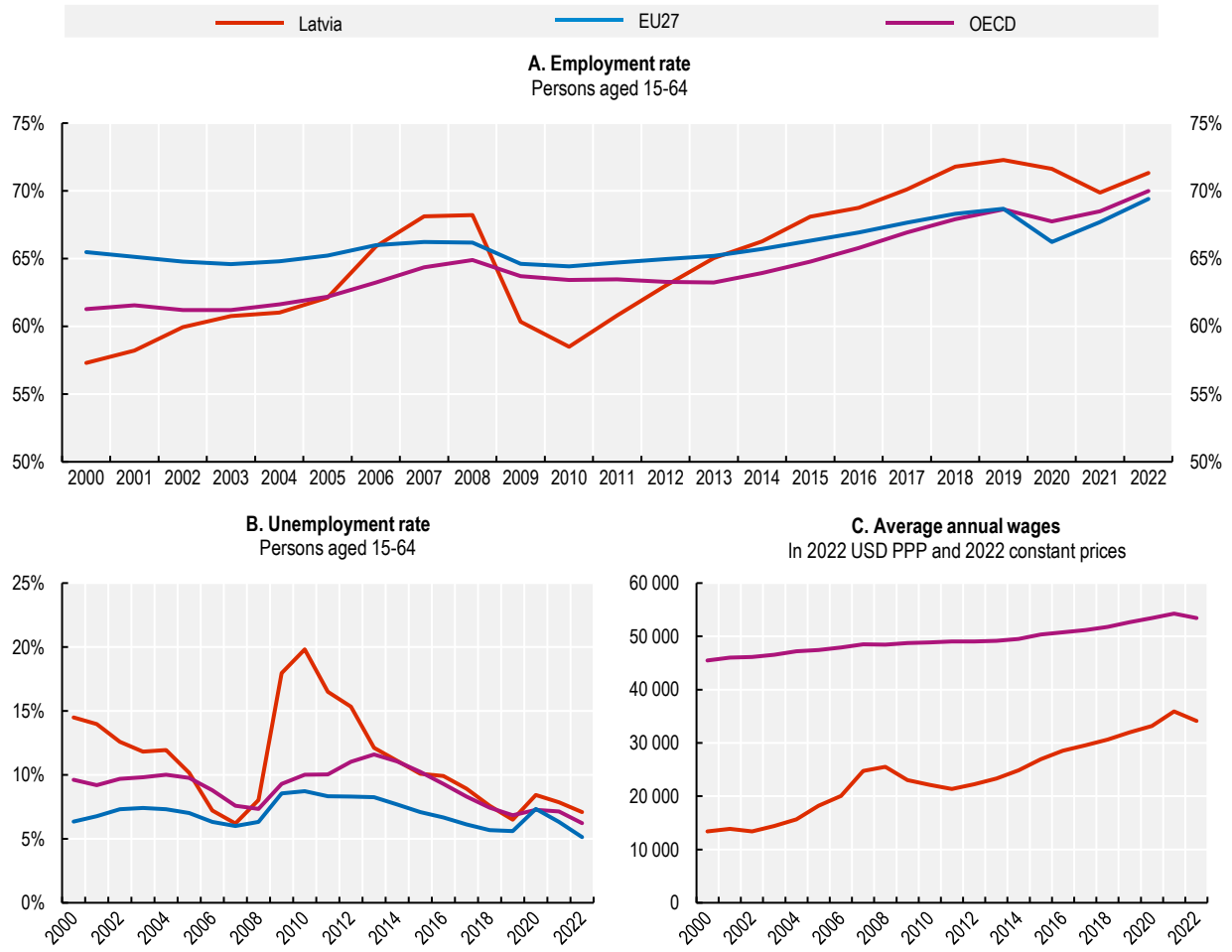
This section summarises key features of the Latvian labour market to understand the context in which the SEA operates.

### *2.2.1. Latvia's labour market strengthened in recent decades and is recovering well post-COVID*

Latvia's economy has experienced strong growth in recent decades catching up to other countries – and this despite the setbacks of the global financial crisis and more recently the COVID-19 pandemic (OECD, 2022[1]; European Commission, 2023[2]). This strengthening economy has supported great improvements to the labour market with increasing wages and employment alongside decreasing unemployment (Figure 2.1). The employment rate has grown strongly since 2000, from below 60% in the early 2000s to 71% in 2022. This significant success has elevated Latvia from a country with an employment rate considerably lower than the OECD and EU averages in 2000 (8 and 4 percentage points, respectively) to a country with an employment rate 1 to 2 percentage points higher than the OECD and EU averages. Likewise, unemployment stood at 7.1% in 2022, well down from nearly 20% in 2010 at the height of the global financial crisis or around the 14% level seen in the early 2000s. These developments have almost eliminated the once considerably higher unemployment rates Latvia had compared to the OECD or EU averages: from a peak of 11.1 and 9.8 percentage points, respectively, in 2010, the difference has since declined to 2.0 and 0.9 percentage points, respectively. Real wages too have risen dramatically, from around EUR 14 500 (real 2022 USD PPP adjusted) in 2000, to EUR 34 100 in 2022 – a 155% increase, while the OECD average increased by about 17% over this time.

The dramatic increases in wages, coupled with increases in the retirement age and factors such as relatively low pensions for individuals with short contributory periods (OECD, 2022[1]), have resulted in steady increases in Latvia's labour force participation rate (the share of the population either in employment or actively seeking to become employed). This positive development – that a greater share of the working age population is willing to engage in paid employment – is particularly important for Latvia's economy in the face of its projected decrease in population (as discussed in the next section). However, the considerable increase in labour force participation has also meant that despite the considerable increase in employment rates, the unemployment rate continues to be slightly higher than in the OECD and EU averages. This, in turn, underscores the important role ALMPs can play to connect individuals with good jobs.

## Figure 2.1. Latvia's labour market has seen great improvements




Note: OECD and EU27 are weighted averages.
Source: OECD Datasets LFS by sex and age – indicators, http://stats.oecd.org//Index.aspx?QueryId=118627 (Panels A and B), and Average annual wages, http://stats.oecd.org//Index.aspx?QueryId=25148 (Panel C).

StatLink https://stat.link/drg76x

*Latvia is recovering well from the COVID-19 crisis, though inflation and uncertainty remain amidst Russia's war of aggression against Ukraine*

The COVID-19 crisis was an unprecedented health crisis that also became an employment crisis across the world (OECD, 2020[3]). During the crisis Latvia's unemployment rate rose to 8.4% in 2020 (average over the year), while the employment rate dipped to 69.9% for 2021 (Figure 2.1). However, the deterioration in the labour market situation was relatively mild compared to the sharply negative effects experienced by Latvia in the wake of the global financial and economic crisis. This may be partly attributable to the strong policy response during the COVID-19 crisis: for example, short-time work schemes and other measures financed with loans backed by EU member states covered 9% of workers in 2021 (European Commission, 2023[2]). Latvia is making a strong post-COVID-19 recovery, both in terms of unemployment and employment figures. In 2023, both had essentially recovered back to their pre-pandemic levels. The unemployment rate decreased to a seasonally adjusted average of 6.4% in the first ten months of 2023, almost on par with the 6.3% recorded in 2019 (Central Statistical Bureau of Latvia, 2023[4]). Similarly, the employment rate stood at 72.0% in Q3-2023 compared to 72.3% in 2019 (Central Statistical Bureau of Latvia, 2023[5]).

The unemployment induced by the COVID-19 crisis led to an increased workload for the SEA. Registrations surged, with the number of registered unemployed increasing by 20 000 people (34%) from 58 000 persons at the end of February 2020 to 78 000 persons at the end of June 2020 (SEA, 2023[6]). These figures have now recovered from the pandemic with the number of people registered at the PES being below pre-pandemic levels.

Another factor creating additional demand for the SEA's resources has been the inflow of people displaced by Russia's war of aggression against Ukraine which has displaced more than 10 million people outside Ukraine. Roughly 4.7 million displaced Ukrainians are in OECD countries (OECD, 2023[7]), of whom 4.2 million are in the EU (Eurostat, 2023[8]). Approximately 38 000 displaced Ukrainian refugees are in Latvia (UNHCR, 2023[9]) which on a per capita basis is among the highest intakes across both OECD and EU countries (Eurostat, 2023[8]; OECD, 2023[7]). Those fleeing Russia's war have diverse needs. Many will need support finding a job, which could be provided by the SEA, while others will have different needs depending on their circumstances which can include childcare and education as well as immediate needs of shelter. To help support Ukrainians in Latvia a dedicated webpage (www.ukraine-latvia.com) provides information on cross-government services available and some relevant regulations (such as on visas, tax, and employment). This includes information on how to contact the SEA for support in finding work, and support is available to Ukrainians in any local office of the SEA. Furthermore, the Riga municipality has established a special support centre for Ukrainians in Riga, where the SEA is one of the institutions to have staff on premises together with other related institutions.

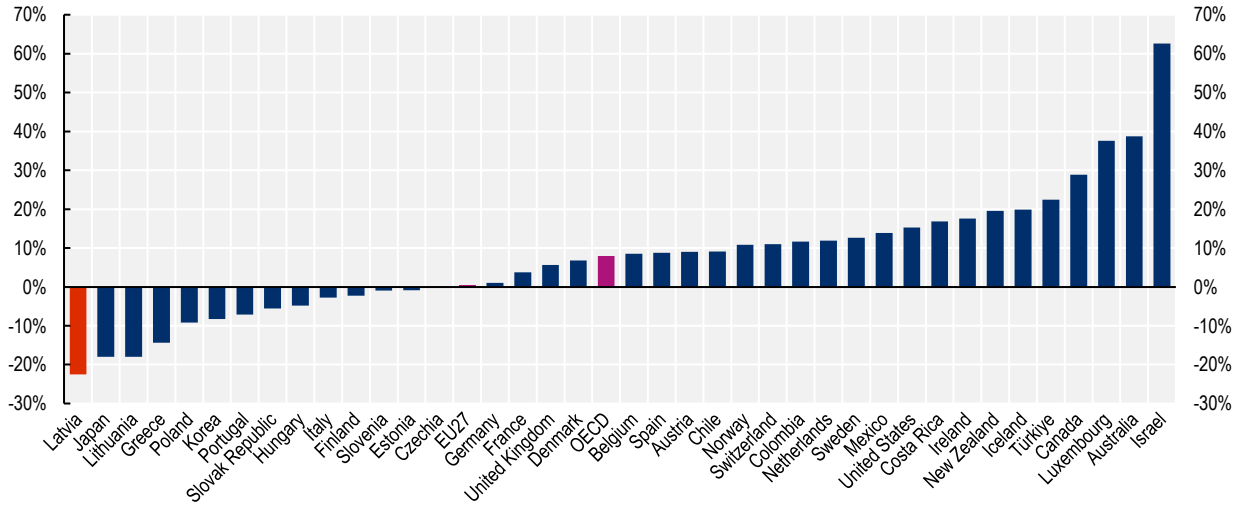
Latvia's economy slowed after Russia's war of aggression began, but growth has since resumed (OECD, 2023[10]; European Commission, 2023[11]). Growth slowed to 3.1% in 2022 and after a technical recession in the first half of 2023, GDP increased by 0.6% in the third quarter of 2023. Headline inflation soared in 2022 and reached an annual peak of 22% in September 2022, but has fall considerably since then, to 2.3% in October 2023 on the back of falling energy and food prices. The increase in energy prices was especially dramatic compared to other goods, as the EU rapidly transitioned away from Russian energy. Indeed, annual energy prices in Latvia rose by 70% in the year to July 2022 but Energy price inflation turned negative in the third quarter of 2023 (European Commission, 2023[11]). Average monthly gross wages rose by 12% year-on-year in June 2023, leading to a slight increase in real wages of 0.1% (OECD, 2023[10]). However, labour demand remains strong, and the minimum wage was increased by 22% in January 2023 from EUR 500 to EUR 620, to into account the EC directive on the adequacy of minimum wages in the face of high inflation (Official Journal of the European Union, 2022[12]).

*Medium- and long-term challenges include a declining and ageing population as well as changing skill demands*

Looking ahead over the medium to long term the biggest challenge facing the Latvian labour market is its declining and ageing population. Indeed, Latvia faces the fastest shrinking population in the OECD (Figure 2.2). This decline being been driven by low birth rates and – to a lesser degree in recent years – the emigration of young people (OECD, 2022[1]), although it is notable that Latvia experienced an increase in population in 2022 due to the inflows of Ukrainian refugees (Central Statistical Bureau of Latvia, 2023[13]). With fewer workers, Latvia will need to make the most of the labour force it has available and possibly increasing the attractiveness of Latvia for workers living abroad, including from the Latvian diaspora. This underscores the importance of ALMPs, which can help to include as many people in the labour market as possible, support employers in filling vacancies and help individuals moving from abroad obtain the skills or certifications they need to integrate into the labour market.

## Figure 2.2. Latvia is projected to have the fastest shrinking population in the OECD

Expected evolution of the population size between 2022 and 2050, by OECD country




Source: OECD Population Projections dataset, http://stats.oecd.org//Index.aspx?QueryId=88954.

StatLink https://stat.link/3zsncg

Securing a highly skilled workforce is crucial for Latvia, especially in the context of the ongoing twin green and digital transitions. The OECD's skills strategy for Latvia has identified four main areas of focus: improving teaching workforce capacity, ensuring sustainable funding for adult learning, creating incentives to retain and attract skilled workers, and building capacity for coherent skills policies (OECD, 2019[14]). ALMPs can support several of these areas, notably through programmes that upskill and reskill workers and through supporting efficient matching of jobseekers with employers.

### *2.2.2. Despite the overall strong performance of Latvia's labour market some groups could do better*

While the labour market in Latvia has broadly improved over recent decades, some groups do not do as well as others. The underutilisation of these groups in the labour market not only limits Latvia's overall economic potential, but also contributes to social hardship. Indeed, the poverty rate at 16% is the fourth highest in the OECD (OECD, 2023[15]). Such groups include:

- **Women:** While women are almost comparable to men in terms of employment rates (70.2% compared to 72.5% in 2022 (OECD, 2023[16]) – and some of this gap is likely due to maternity leave) more concerning is the gender wage gap. Latvia's gender wage gap is the third highest among OECD countries with median female earnings of full-time employees 23.9% lower than men (OECD, 2023[17]).
- **Younger people and older people**: Older people have lower rates of employment than prime-aged individuals and sizable numbers of youth are at risk of labour market exclusion, although these challenges are lower in Latvia compared to the OECD and EU averages. In Latvia, 11.9% of youth aged 15-29 were not in employment, education or training (NEET) in 2022, comparable to the OECD average of 12.6% (OECD, 2023[18]) and the EU average of 11.7% (Eurostat, 2023[19]).[1] Older individuals aged 55-64 have employment rates about 10 percentage points lower than those aged 25-54 (71.6% compared to 82.6%) in Latvia (OECD, 2023[20]). Latvia's difference in employment rates between these two age groups is considerably smaller than the OECD and EU averages, which amount to 16.1 and 19.5 percentage points, respectively (Eurostat, 2023[21]; OECD, 2023[20]).
- **People with disabilities**: People with disabilities in Latvia are around 18 percentage points less likely to be employed than people without a disability. While this is lower than the EU average of 24 percentage points, it is still a significant gap (data are from 2019, see European Commission (2021[22])). Reducing this gap has been a political priority in Latvia, and indeed some specific measures are provided by the SEA to support people with disabilities. These include employment subsidies targeted to those with disabilities, online trainings for those with disabilities, regional mobility measures, and other assisting support (such as silent language interpreters and occupational therapy). Furthermore, support is available to employers to adapt workplaces to the needs of employees with disabilities.
- **The long term unemployed**: Despite declines in recent years, long term unemployment is a challenge in Latvia, with 29% of unemployed persons unemployed for 12 months or more (OECD, 2023[23]; Eurostat, 2023[24]). While this figure has fallen considerably from the 2011 peak of 55%, it remains a significant share of the unemployed and somewhat more than the 2022 OECD average of 25% (although it is considerably lower than the EU average of 39%).
- **Those in regions with less employment opportunities**: Large labour market disparities exist in Latvia between regions (OECD, 2019[25]; OECD, 2019[26]). For 2022, there is an 8-percentage point gap between the region with the highest employment rate (Pieriga, 74.5%) and the region with the lowest (Latgale, 66.4%).
- **Individuals whose earnings or employment are not (fully) reported**: Informality is a longstanding issue in Latvia (OECD, 2019[26]; OECD, 2022[1]), particularly in terms of underreported salaries (as opposed to undeclared employment, which is a relatively smaller issue). While the shadow economy is difficult to measure precisely, one survey-based analysis suggests it accounted for more than a quarter of economic activity (26.5%) in 2022 (Sauka and Putniņš, 2023[27]). Another estimate, which uses several economy-wide indicators to provide estimates that are comparable across countries, estimated it to be 20.0% (Schneider, 2022[28]), slightly higher than the EU average of 17.3%. Such informality limits the extent to which individuals can access

contribution-based benefits such as those for unemployment or retirement, and may limit the extent to which they seek recourse for labour code infringements.

## 2.3. The ALMP basket has diversified but the SEA faces tight financial constraints

This section provides an overview of Latvia's approach to ALMPs, examining the role of the SEA, the financing of ALMPs, and the evaluations of their effectiveness.

### *2.3.1. The SEA is responsible for delivering ALMPs in Latvia*

The SEA is responsible for the delivery of ALMPs in Latvia which operates under the supervision of the Ministry of Welfare (MoW). The SEA's roles and responsibilities are set forth in the "Support for Unemployed Persons and Persons Seeking Employment Law" (The Parliament of the Republic of Latvia, 2002[29]) while the SEA maintains a strategy for how to best achieve its goals.

The SEA's stated mission is "to promote inclusive and sustainable employment in co-operation with employers and co-operation partners" (SEA, 2021[30]). The SEA clients include unemployed persons, those at risk of unemployment, as well as employers. The SEA's services include counselling of jobseekers, supporting people into specific measures such as training programmes (through a voucher system with external providers) and wage subsidies, support for regional mobility, support for vacancy matching between employers and jobseekers, support for employers in finding employees and forecasting of the labour market.

Many programmes exist to provide support to specific groups. These overlap with many of the groups identified in Section 2.2.2 and include support for those with disabilities, programmes for older workers, support to relocate across regions, programmes for youth and programmes for those who are long-term unemployed. Those at risk of unemployment also have access to services from the SEA. Such services include life-long learning programmes targeted broadly to employed people who are either over 50, lack skills or education, have a disability or, indeed, anyone else deemed to be at risk of unemployment (SEA, 2022[31]). Anyone can browse vacancies on the SEA's CV and vacancy portal (i.e. a log-in is not required to view vacancies), which means the platform can be helpful to people who are at risk of unemployment and support is also offered in the case of collective redundancies. The CV and vacancy portal is discussed further in Chapter 3 in the context of the overall IT infrastructure, and in Chapter 4 in the context of its functionality.

The overall budget for ALMPs is set by an act of parliament with the SEA and the MoW working closely together to determine the specific expenditure needs and allocations within the SEA's service provision. The MoW provides some input into the decisions on the SEA operating model, and plays the leading role for ALMP design, strategy and budgeting of ALMP measures and the SEA operating costs. The social partners are also engaged in the ALMP system as they advise the SEA and can form part of the steering committee on specific projects, as well as contribute with proposals for reskilling and upskilling (Lauringson and Lüske, 2021[32]).

Other organisations form part of the ALMP eco-system. Benefits (i.e. passive labour market policies) are administered by the State Social Insurance Agency (SSIA), while municipalities deliver social assistance and social services. As registration with the SEA is one of the requirements for receiving an unemployment insurance benefit, data is exchanged between the SSIA and the SEA on a regular basis. Indeed, the SEA exchanges data with several other agencies including the State Medical Commission for the Assessment of Health Condition on Working Ability (SMC), Municipal Social Assistance and Social Services Administration Application and the Citizenship and Migration Affairs. Chapter 3 of this report reviews the IT systems of the SEA including data exchange with external registers.

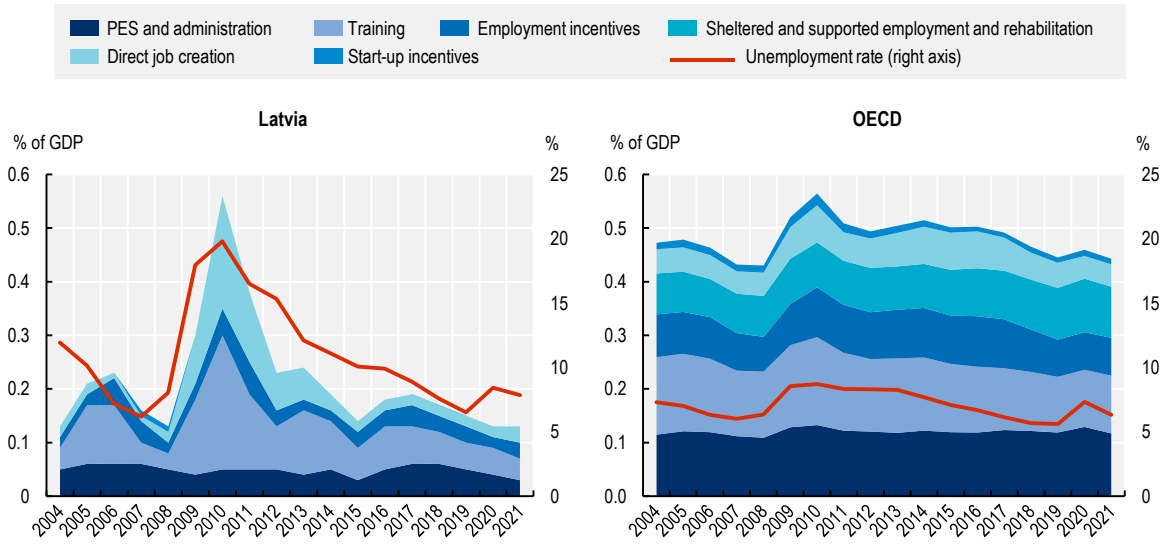
### *2.3.2. ALMP spending is low and financing often temporary*

Latvia's recent spending on ALMPs remains much lower than that of other OECD countries, consistent with the pattern over the last two decades (Figure 2.3). While the level of spending has varied significantly in line with fluctuations in the unemployment rate, reaching a peak of 0.56% of GDP in 2010, the levels of spending have consistently been lower in Latvia, amounting to 0.14% of GDP in 2021 (compared to 0.45% and 0.53% in the OECD and EU, respectively). This has been the case both in total and across individual categories of ALMPs, with one notable exception: direct job creation programmes, which in 2010 amounted to 0.21% and exceed the OECD average of 0.14%. In the following period, spending with Latvia has made efforts to shift money away from direct job creation programmes, decreasing to around 0.03% of GDP in 2021. This shift is welcome given that international evidence suggests direct job creation programmes are ineffective in supporting people back into the regular (i.e. unsupported) labour market (Card, Kluve and Weber, 2018[33]; European Commission and Ismeri Europa, 2023[34]).

However, in total Latvia spends too little on ALMPs. While spending less on direct job-creation could have been an opportunity to channel funds towards more effective programmes, this has not happened. Instead, ALMP spending has declined. While a decline makes some sense in the context of reduced unemployment, the fact that Latvia still spends far less than the OECD or EU averages is at odds with its slightly higher unemployment rate. The lower resources available for ALMPs also decrease the role the PES can play in offering jobseekers support. Indeed, between 2010 and 2020 the percentage of unemployed people who report having contacted the SEA in the labour force survey fell by about 10 percentage points from 55.8% to 45.6% (Eurostat, 2023[35]).

**Figure 2.3. Latvia spends little on active labour market policies despite an unemployment rate above the OECD average**

Spending on active labour market policies (ALMPs) by category as a share of GDP, 2004-21




Note: PES: public employment service. GDP: gross domestic product. Employment incentives are net of category 42 (Employment maintenance incentives), to remove as much as possible measures that are specific to COVID-19.
Source: EC-OECD Labour Market Policies Database, https://stats.oecd.org/Index.aspx?DataSetCode=LMPEXP and OECD dataset: LFS by sex and age – indicators, http://stats.oecd.org//Index.aspx?QueryId=118627 for unemployment.

StatLink https://stat.link/s834km

Latvia has scope to increase its spending in all categories including on PES administration. Indeed, wage scales at the SEA are regulated by the State Chancellery and set at a low governmental level, which can make hiring qualified staff difficult and many vacancies for positions at the SEA are unfilled.

The structure of funding, with a strong share of EU-based funding, is such that many of the ALMPs do not have long-term, guaranteed funding streams. Programme or project-based EU funding makes up roughly 60% of ALMP spending in Latvia. Such support includes funding from the EU's Recovery and Resilience Facility, funding from the European Social Fund Plus (ESF+) and its predecessors, most notably the European Social Fund (ESF). In the context of Latvia's National Recovery and Resilience Plan EUR 28 million is allocated for upskilling the unemployed (European Commission, 2021[36]).

Experiences from EU countries show that ensuring an even use of EU funds can be challenging in practice. For example, EU programming periods last several years, and initial years typically have low fund absorption rates, which gradually increase towards the middle and end of the period (Lutringer, 2022[37]). Although programming periods often overlap – with new periods starting while previous ones are still in progress – this can also create administrative challenges, especially in countries with tendencies for late spending. Furthermore, as the level of EU funding provided is tied to indicators such as the level of regional development, the level of funding is likely to decrease as Latvia becomes more developed.

In Latvia, as in many other EU countries, additional funds from national sources could boost ALMP spending and provide less project based and more sustainable financing. This is important for many activities and including those that are the focus of this project, namely for maintaining and developing a modern IT infrastructure alongside effective digital tools (see Chapter 3 for more detail on how financing impacts IT development).

### *2.3.3. Previous evaluations have shown Latvia's ALMPs to be effective, but that they could be improved further*

Evaluations are an important method for assessing how well a PES is operating. Different types of evaluation and monitoring answer different questions and require different information, resources and expertise to conduct. Quantitative counterfactual impact evaluations aim to study the causal effect of ALMPs on key outcomes such as employment and earnings among others. Meanwhile qualitative evaluations can identify whether programmes are implemented as intended and spot ways to improve processes. Monitoring statistics can serve as an immediate source of information from understanding caseloads at different local offices or among counsellors, to understanding the sorts of clients seeking services, to learning the level of uptake for different support measures, or to observing performance indicators like the percentage of people employed following a programme's completion. To effectively understand and improve performance of a PES all forms of evaluations are required and serve complimentary purposes.

#### *Evidence suggests Latvia's ALMPs support people into employment*

In 2019, the OECD published an evaluation of Latvia's ALMPs (OECD, 2019[25]). In particular, the OECD looked at Latvia's training programmes for unemployed persons (which operate through a training voucher), mobility and entrepreneurship support measures, and wage subsidies for vulnerable groups. The report made use of rich linked administrative data from different registers that enabled to identify the participants in such programmes, similar non-participants, and outcomes for both groups.

Overall, OECD (2019[25]) found that training programmes improved the chances of participants finding a job as well as their earnings relative to comparable non-participants. Combining training programmes with support for regional mobility seemed to provide even more effective results. Such relocation support can be important in Latvia due to the regional differences in labour markets discussed in Section 2.2.2.

The OECD also found positive effects for employment subsidy programmes studied, although such programmes were not effective for everyone. The employment subsidies studied were targeted towards many of groups that face more obstacles in the labour market, as described in Section 2.2.2. They paid for up to 50% of an eligible employee's wage and their duration lasted from 6 to 24 months (depending on the programme and target group). The report found that older workers, young people and the long-term unemployed benefited from such policies, though there was no clear positive effect for people with disabilities.

Latvia's Ministry of Finance is also involved in evaluating ALMPs as part of the evaluation requirements of funding from the European Union. The Ministry of Finance does not conduct the evaluations but rather contracts them out to private providers who are provided with anonymised data linked across administrative registers including on ALMP participation from the SEA and employment outcomes from the State Revenue Service. The data processing and linking requires quite some time and effort from the Ministry of Finance before it is sent to the private provider to do the analysis.

A recent evaluation of the EU funded ALMP programmes for the 2014-20 EU financing period, commissioned by the Latvian Ministry of Finance, used a variety of methods including both quantitative analysis using linked administrative data and qualitative interviews with stakeholders (Baltic Institute of Social Sciences, 2022[38]). Indeed, the quantitative part of the study used counterfactual impact evaluation methods where participants are compared to a similar control group (as in the OECD report). The study found training programmes in Latvia to be effective in boosting employment. By providing detailed information on costs the report was able to show which programmes were most effective (those targeted towards carers, logistics, customer services, security, and driving were found to be the most cost-effective vocational trainings for increasing the probability of employment) (Baltic Institute of Social Sciences, 2022[38]).

*However, Latvia's ALMPs could be even more effective and scaled up to serve more clients*

Despite the successes of Latvia's programmes, the evaluations outlined above, as well as the views of stakeholders, have identified several areas for improvements. These include that some disadvantaged jobseekers may need additional support to use their training vouchers, while some municipalities do not have as many training providers as others (OECD, 2019[25]). It was also found that not all training providers are of good quality, that some courses are not sufficiently practical, and that assessment of students is not always as independent or involving of industry as it could be (as found by The State Education Quality Department (IKVD)). Further administrative processes for employment subsidies can be burdensome (OECD, 2019[25]), and in general the SEA could work more with employers to lift engagement (Baltic Institute of Social Sciences, 2022[38]). Finally, intensive work of the SEA counsellors with clients could better tailor services to individual jobseeker's needs (Baltic Institute of Social Sciences, 2022[38]).

Modernising the SEA through digitalisation and data could help support the SEA to address many of the challenges identified by the evaluations. Digital tools can directly support the SEA staff by helping them better understand their clients and free up their time by automating processes so that staff can more intensively work with clients where they can have the most impact (such as jobseekers who need extra attention, or with employers that are not engaged). Moreover, digital tools can directly support the SEA clients. For example, effective and modern CV and vacancy matching can aid jobseekers, employers and those at risk of unemployment, while automation and digitisation of processes can help reduce the time these clients spend filling paperwork. The next two chapters of this report assess the SEA's IT infrastructure and use of PES digital tools.

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## Note

[1] Due to methodological differences, the figures from the EU are not entirely comparable: according to the Eurostat statistics, the average for Latvia in 2022 was 11.3%.

# 3 Assessment of the IT infrastructure in the State Employment Agency

The State Employment Agency in Latvia (SEA) recognises its IT backbone as a key prerequisite to deliver good services to its clients and has been able to develop an IT system that meets most of its current vital needs despite limited resources. The IT backbone supports the main tasks of the SEA, such as registering jobseekers, managing services and measures, registering vacancies, and matching jobseekers and vacancies. However, the system is not fully efficient and modern, for example in terms of solutions for data analytics, quality, exchange and protection. The IT architecture of the SEA is not entirely future-proof regarding the potential needs to develop new functionalities.

## 3.1. Introduction

This chapter reviews and assess the overall digital infrastructure and data management processes in the State Employment Agency (SEA) in Latvia, focusing on the architecture of its operational IT system, related processes and practices, and data analytics solutions. The specific applications and tools to support the core tasks of a public employment service (PES), like matching jobseekers and vacancies or profile jobseekers, are reviewed in the next chapter (Chapter 4).

The SEA recognises its IT backbone as a key enabler to deliver good services to its clients, but the scarce resources limit the modernisation and digitalisation of the SEA. In general, the overall IT backbone of the SEA is able to cater for most of the current needs of the SEA. The main operational IT system BURVIS supports the main tasks of the SEA, such as registering jobseekers, managing services and measures, registering vacancies, and matching jobseekers and vacancies. However, the IT system does not include sufficient data management functionality, particularly in terms of data quality management, data sharing solutions with external parties and data analytics. In addition, the architecture of the current IT system is not fully future-proof as the monolithic approach can add unnecessary complexity into the development of new functionalities.

This chapter starts by discussing the business needs of the SEA that have implications for the IT infrastructure, as well as the SEA's strategy and development processes to strengthen the IT backbone, followed by a review of the IT architecture (server environments, system interfaces, software), the data analytics solution, and processes and practices related to the IT infrastructure (backups, data quality management, system and data security).

## 3.2. The SEA recognises the importance of its IT infrastructure, but can assign only limited resources to its development

The IT infrastructure is only fulfilling its purpose if it meets the business needs of the organisation and helps to achieve the strategic objectives. This section first discusses the business needs that PES have and how these needs translate into the requirements for the IT infrastructure. Subsequently, the section reviews how the SEA has considered the implications for its IT system in its strategy, and which resources and capacities the SEA possesses to develop the IT backbone that would help to achieve the strategic objectives.

### *3.2.1. The IT infrastructure of the SEA needs to support jobseekers, employers, co-operation partners, as well as the SEA staff in different functions*

Modern digital infrastructure is key for PES to meet the diverse needs of jobseekers, people at risk of job loss and employers effectively and efficiently (OECD, 2022[1]). An advanced and well-integrated IT backbone encompassing both back-office infrastructure and applications and interfaces for clients, partners and other stakeholders in the wider "PES ecosystem" enables to maximise the PES administrative capacity and the value-added of its services.

Digitalisation in PES is not a goal in itself but needs to support the business model of the PES as well as possible, facilitating the PES to fulfil its core objective of supporting jobseekers, people at risk of job loss and employers. It means that the main function of the IT infrastructure in the SEA is to enable its employment counsellors to fulfil such tasks like jobseeker registration, identification of support needs, development of individual action plans, case management, vacancy registration, matching jobseekers to vacancies, and the provision of different active labour market policies (ALMPs). In addition to these key elements of actual service provision, the IT infrastructure should support counsellors in managing their

tasks, such as monitoring and managing their portfolios of jobseekers or monitoring the process of ALMP provision.

The IT infrastructure in PES also needs to facilitate other business processes in the organisation, besides the delivery of services to jobseekers and employers. The management of the SEA needs to be able to monitor the processes and the performance of the organisation, including by different divisions and functions, to be able to make operational decisions on the organisation of service delivery, as well as design the SEA strategy. The SEA management needs to be supported by data analytics both by having systematic key information accessible via the IT infrastructure, and needs-based information presented by the statisticians and analysts in the SEA. The latter staff needs data analytics solutions to cater to the needs for evidence of the SEA management, as well as other internal and external stakeholders and the public more generally.

The SEA IT infrastructure also needs functionalities vis-à-vis external organisations and stakeholders. Functionalities for data exchange are necessary to receive data from other registers to be able to provide better services and generate more credible evidence, and share data to support other public sector organisations in providing their services and generating evidence. The data exchange solutions should ideally aim at the "once-only" data collection principle that is progressively being implemented in the OECD countries and for example encouraged by the European Commission in its Single Digital Gateway Regulation to support Digital Single Market in the context of cross-border data exchange.[1] In addition, secure data exchange channels are relevant to share data with external researchers.

For more efficiency and user-friendlier service provision, PES services need to be accessible for jobseekers, people at risk of unemployment and employers also digitally for independent use, i.e. without the intermediation of PES staff. The trend in client needs for digital self-service platforms was elevated particularly along with the containment measures and limits to in-person services put in place due to the emergence the COVID-19 pandemic (OECD, 2022[1]; 2022[2]; 2021[3]), and the demand for such digital services has remained higher than before the pandemic. Similarly, the higher need for digital communication channels between the PES and its clients has remained. Hence, the digital infrastructure of the SEA needs to facilitate receiving information from jobseekers and employers directly, sharing information from the SEA to jobseekers and employers and communicating with them in real time (e.g. receive counselling services digitally). Jobseekers should be able to, for example, initiate their registration independently, search for jobs in the SEA database, access digital resources to improve their application documents and employability, apply for jobs and ALMPs. Employers need to be able to access such functionalities like uploading vacancies, searching for suitable candidates in the SEA database and applying for the SEA services and measures. Similar digital self-services could be relevant for other stakeholders and the SEA partners, such as for training providers to apply be a partner organisation for the SEA.

Besides providing a general backbone for PES service provision, digitalisation has a potential to vastly enhance the effectiveness and efficiency of PES services. Such benefits can be reaped if the digital solutions aim to go past simply digitising otherwise non-digital processes, but aim to digitalise the processes, i.e. make the processes faster, leaner and smarter via automation, data linking, advanced data analytics and Artificial Intelligence (AI) algorithms. However, adopting new digital tools using advanced analytics and AI set additional requirements on the technological stack of the PES, so that these new tools could be integrated into the overall IT infrastructure seamlessly. The next sections and Chapter 4 discuss how the IT infrastructure in the SEA meets these (future) needs as well as the needs listed above.

### *3.2.2. The importance of the IT backbone is highlighted in the SEA strategy*

The SEA does not have a dedicated strategy or overall concept for its digital infrastructure and services. Nevertheless, the IT infrastructure is addressed extensively in the SEA's general strategy for 2021-23 (Nodarbinātības valsts aģentūra, 2021[4]). One of the three key objectives that the SEA has set to itself, is

to promote the SEA as the leading partner in personnel recruitment in Latvia,[2] under which the strategy highlights the sub-goals of promoting the SEA's portal for matching jobseekers and vacancies (CVVP portal), improving the services for employers e.g. by a forecasting platform for labour supply and demand and improvements in digital services, and improving labour market information system for the public (labour market indicators, labour market forecasts, training opportunities, skills and occupations in demand, career guidance information, etc.).

The SEA's three-year-strategy also rightfully recognises the SEA's IT infrastructure as a key prerequisite to achieve the set objectives, and increase the effectiveness, efficiency, accessibility and user-friendliness of the SEA's services. To maintain and improve the IT backbone, the SEA strategy highlights the needs to implement more modern and harmonised approaches within its key systems and approaches, such as in terms of a uniform approach to document management, data storage, data security, and software and hardware management. Furthermore, the strategy includes ambitious intentions for the future in terms of strengthening the SEA's analytical capacity via modern data analytics and visualisation tools, adopting AI solutions to be able to process Big Data in the SEA's digital tools, and making more of the SEA's data available for the clients and public as open data.

The SEA's strategy justly acknowledges that developments in the IT infrastructure are not separate processes but need to serve the purposes of the SEA's core business processes and services, and consider the needs of end-users, such as the SEA staff. The SEA staff is expected to have sufficient digital skills and improve them regularly, including on cyber security to reduce security risks. Furthermore, the SEA aims to facilitate the working modalities that have considerably changed since the COVID-19 pandemic, comprehending the needs to ensure IT equipment and appropriate technical solutions for service provision both via face-to-face and remote channels.

### *3.2.3. Tight resources limit strategic planning*

Although the SEA's strategy has identified the medium-term needs for improvements in the IT infrastructure, the budget to implement modernisation is limited and often project-based similarly to the overall SEA budget (see Chapter 2). The IT team in the SEA is very small, aiming to manage day-to-day maintenance issues and co-ordinate and manage IT developments that are implemented by external providers. The funding for these outsourced IT developments from the state budget is low and covers the urgent maintenance, updating and improvement needs, but does not enable major developments. The additional funding from the European Union (EU) resources (such as European Social Fund, Recovery and Resilience Fund or European Regional Development Fund) help cover additional needs for IT developments, but these projects are then with a limited scope and do not cover longer-term maintenance costs of these newly developed IT solutions.

While combining the resources from the state budget and the EU funding has enabled the SEA to develop an IT infrastructure that covers most of its business needs (see the next sections), this funding model is posing serious risks for a more sustainable modernisation. The scarce funding has been one of the main reasons the SEA has not been able to implement all necessary data exchanges with the external registers (Section 3.3.3) or adopt modern and efficient data analytics (Section 3.4) and data quality management solutions (Section 3.5.2). Furthermore, the volatile funding model poses a threat of ending up with a patchwork of digital solutions that are not fully integrated, compatible or aim at the same strategic concept for the digital backbone.

In addition to the insufficient financial resources, the SEA faces challenges in adopting and implementing new digital tools and technologies due to a lack of skills to develop and implement modern solutions, some resistance from the SEA staff to take up such solutions, and difficulties in understanding how the technology works or explaining how it works to staff and jobseekers (responses from Latvia to the OECD questionnaire on PES digitalisation launched in March 2023). These challenges have for example contributed to the changes in the digital tool to profile jobseekers to segment them into appropriate service

streams, which since 2019 significantly simplified and turned into a manual process to be conducted by the employment counsellors (see Chapter 4).

The challenges related to staff skills, comprehension of and resistance to advanced digital solutions is potentially connected to low and constrained wage structures for the SEA staff (see Chapter 2). As such, the low wages do not hinder only service provision to the SEA's customers by the front-line staff, but also the high-level and strategic changes in the overall IT backbone of the SEA, compromising the key underlying prerequisite for efficient and effective services.

### *3.2.4. End-user needs are not systematically considered in the IT developments*

The major decisions on adopting new or adjusting existing digital solutions are taken jointly by the Ministry of Welfare (MoW) and the SEA (i.e. decisions going beyond general upgrading, bug elimination or small-scale fine-tuning). This is an appropriate decision-making process, as MoW is responsible for the high-level design of services for jobseekers, people at risk of unemployment and employers, as well as needs to drive the process of achieving a sufficient budget for the IT developments from the state budget and external funding sources. In addition to the high-level management, the SEA also involves its IT department and the departments in charge of the relevant services and measures in the decision-making to take on board the SEA's business needs, as well as IT capabilities.

Within the process of making decisions on adopting or adjusting digital tools, the potential end-users are sometimes consulted to ensure that the digital tools meet the users' needs. For example, to make decisions on the objective and design of the new skills profiling tool (see Chapter 4), the SEA management consulted its front-line staff to understand which kind of insights from the new tool would help them best to provide career management advice to jobseekers. Nevertheless, the consultations with end-users have not taken place systematically regarding all end-users (such as employers or partner organisations) or all new digital developments. The end-users are also not involved in the later stages of the IT development processes. Only the SEA front-line staff is involved more systematically in the testing stage.

The key issues considered during the decision-making processes for new IT developments concern the value-added and objectives of the new solutions, data protection issues, impact on the end-users (including the SEA staff), and integration with the existing IT infrastructure and service provision processes. Yet, monitoring of these different aspects after a new solution is adopted, takes place only ad hoc if at all. The SEA has monitored so far for some of its new solutions such indicators like the take-up rates by users, efficiency gains in processes and some aspects of service quality. The SEA has no experience yet in monitoring and evaluating the impact on labour market outcomes (e.g. the effects on jobseeker employment rates), end-user experience and satisfaction or cost-savings of its digital solutions. The technical support provided by the OECD and the European Commission to MoW and the SEA also includes a component to build capacity in MoW and the SEA to monitor and evaluate ALMPs, including digital tools used for ALMP provision (OECD, 2022[5]).

### *3.2.5. IT developments are tied to the capacity of the development partner*

The IT developments of the SEA are fully outsourced to external providers, while the SEA IT department is driving the procurement and development processes. The IT department is involving the relevant departments in the SEA in charge of the respective business processes needs-based, above all in identifying and describing the business needs, taking decisions related to functionality and design, as well as testing. As such, the business units in the SEA are not clearly assigned to be the drivers for the digital improvements in the services they should generally be in charge of. Furthermore, smaller-scale changes in the IT infrastructure are decided internally in the IT department of the SEA. In general, the development practices have some features of agile development methodology, but these are not fully aimed to be or implemented as such.

The developments in the SEA's IT infrastructure are implemented mostly by the same external provider in Latvia (UNISO). This provider is continuously winning the tenders as it complies well with the requirements that the SEA has set in the procurement documents. The co-operation with UNISO has turned into a long-lasting co-operation, and this provider has been the single developer regarding the key parts of the IT infrastructure (BURVIS, see more in the next sections).

As the SEA is essentially working with one provider and the funding for the developments is project-based, it has been difficult to achieve a continuous improvement process for the IT infrastructure. The project-based funding leads to short development processes, which have led to compromised development quality. Working with a single provider also poses capacity constraints, as the resources that can be mobilised in short notice are limited. As of early 2023, the SEA had some 40 urgent improvement requests in the development list (e.g. requests for changes from the SEA internal users, including those mediated by the internal users, but coming from the external users, such as a request from external partners to publish their vacancies in the SEA portals) that were expected to take still some time to be implemented. As a solution, the SEA is analysing the feasibility and possibilities to work with additional IT providers.

## 3.3. The technology stack in the SEA does not exhibit major challenges in supporting service provision

The key elements of the IT backbone, such as the high-level architecture of the infrastructure (the set-up of databases, user interfaces, interfaces for data exchange between internal databases and external registers), the server environments and the programming languages used for the individual components define the capacity, speed, security, flexibility for adjustments and the potential functionality of the overall IT infrastructure. This section reviews the key elements of the IT backbone in the SEA.

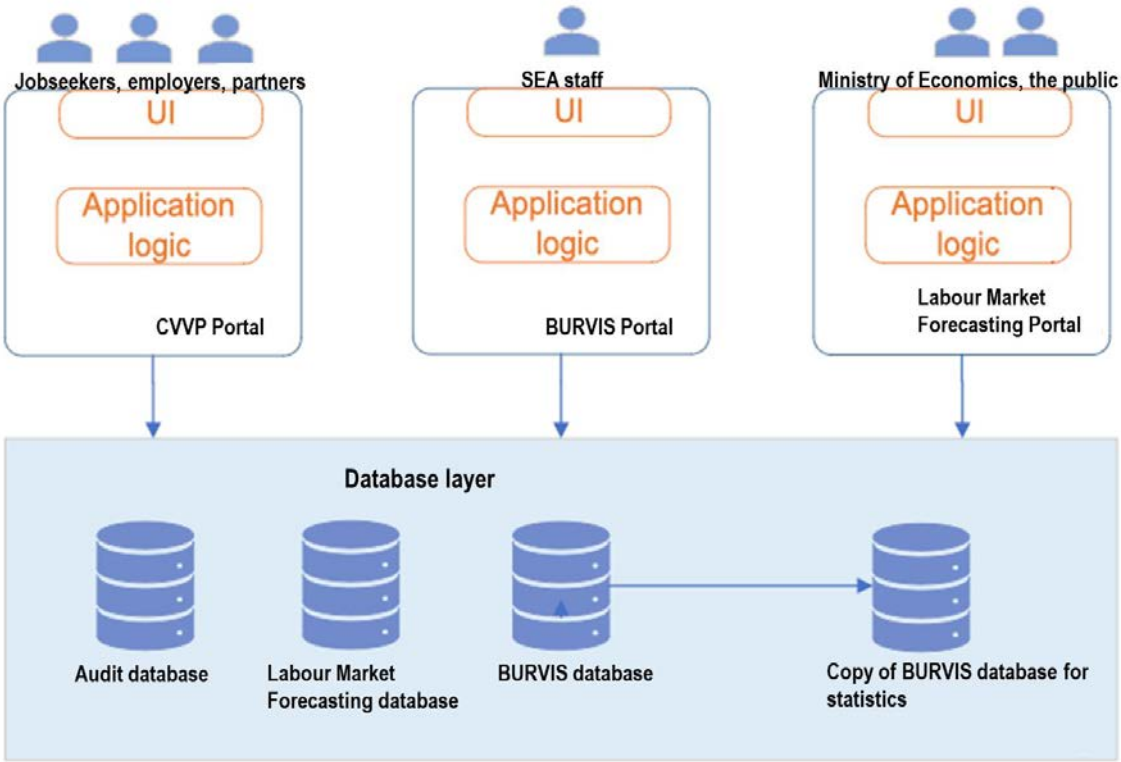
### *3.3.1. The high-level IT architecture generally meets the operative needs of the SEA*

The high-level IT architecture in the SEA contains three portals, each of them having a dedicated interface and application logic, as each of them serves ad different purpose and supports a specific group of users (Figure 3.2):

- BURVIS portal – a portal for the SEA internal staff to provide services for jobseekers and employers. It is the main portal linked to the BURVIS operational database which is the official register of unemployed and vacancies.[3]
- CV and Vacancy Portal (CVVP) – a public self-service portal for the SEA clients (jobseekers, employers) and co-operation partners available at https://cvvp.nva.gov.lv/ to make some of the SEA services digitally available for independent use, e.g. for jobseekers to find suitable vacancies. The CVVP is also linked to the BURVIS operational database.
- Labour Market Forecasting Portal – a dedicated tool developed in co-operation with the Ministry of Economics to disseminate labour market forecasts to the public, available at https://prognozes.nva.gov.lv. This tool is not used in the process of day-to-day service provision and is not linked to the BURVIS operational database, but its own separate database containing only aggregate statistics from the BURVIS database and aggregate data from external sources (i.e. no personal data). As this tool is less linked to the operational IT system of the SEA, it is discussed separately in Section 3.3.4.

The BURVIS and CVVP portals store data in and fetch data from the BURVIS operational database, which is the main operational database in the SEA to record processes to support jobseekers, people at risk of job loss and employers. In addition, the SEA IT infrastructure includes an audit database that logs all actions ("clicks") in the BURVIS and CVVP user interfaces for data and system security management, and a copy of the BURVIS database that is used above all for data analytics (see discussion in Section 3.4 on the data analytics solution).

### Figure 3.1. The high-level architecture of the SEA includes three main portals to serve the different user groups and purposes




Note: UI – user interface. SEA – State Employment Agency. In addition to the IT infrastructure depicted on the graph, the SEA has another system for document management to support BURVIS system and accounting, called Horizon.
Source: Authors' work based on inputs from the State Employment Agency.

The overall architecture of the operational IT system (the BURVIS portal, CVVP portal and BURVIS database) generally meets the current operative needs of the SEA. This architecture also allows meeting the potential future development needs, although it is not completely modular and thus not as flexible as it could be. It means that the current architecture does not prevent developing new functionalities, but these developments can be slightly more difficult to implement than in a more modular set-up. Nevertheless, modifying the system architecture that has been developed over a longer time period is usually more costly than the value-added from the changes. Yet, also the more granular architecture of the system (particularly the BURVIS portal and database) might not be sufficiently flexible to accommodate even some of the minor changes in its functionality or these changes can be unnecessarily cumbersome, which has also been one of the reasons for the long list of improvement needs to accumulate and strain the capacity of the external development partner (see Section 3.2.5).

### *3.3.2. The server capacity and set-up are sufficient*

*Production environment uses a single-server approach*

All applications (i.e. portals, databases) in the production environment of the SEA's IT infrastructure (i.e. live environment where the different applications are used by the SEA staff and clients for their intended purposes) are running in their dedicated virtual servers:

- The application server for the BURVIS portal
- The application server for the CVVP portal
- The BURVIS database server
- The audit database server (logs)
- The web frontend server
- The server for the Network File System (previously used to upload CVs to the CVVP portal) and an old database (old logs)
- The server for the copy of the BURVIS database (a nightly database dump for data analytics and backup)
- The database server for bug tracking / ticketing system

The set-up of eight servers for the production environment is likely able to meet the current needs of the SEA, considering also that the new physical servers were taken into use only two years ago. Nevertheless, the SEA staff sees some processes in the user interfaces as being too slow (e.g. when using the jobseeker and vacancy matching services), which can refer to the low capacity of the server as one possible underlying reason. In addition, the current set-up might not be sufficient in the future in case additional interfaces/applications would need to be adopted, the volume of the databases would continue growing over the years or if the number of users of the system would grow substantially.

Indeed, the volume of the SEA databases is growing as historic data are not deleted or archived. The data volume is growing particularly fast in the audit database, which is about 400 gigabytes as of March 2023. The full details of log data are retained in the audit database without anonymising or dropping information that would be less relevant after many years have passed. Regarding the BURVIS database, the regulation foresees a required time to keep the data in the system (different deadlines depending on the type of data), prescribing anonymisation or deletion of data afterwards. Yet, these processes have not been implemented in the BURVIS database either.

It will be possible to extend the capacity of the current set-up by adding more capacity to the servers. However, this set-up cannot be extended beyond the capabilities of single server(s) as there is currently no multi-server capability in the SEA which would allow adding more servers with load balancers (mechanism to redistribute network traffic between servers to maximise speed and capacity). Yet, moving from a single-server set-up per application to a multi-server approach would usually also require changes in the applications themselves, so that these would be able to function in a "stateless" mode. Similar to a multi-server approach with load balancers, a modern system could be operated in containers (such as Kubernetes, which is an open-source container orchestration system for automating software deployment, scaling, and management). A system with containers requires similar application functionality as the multi-server approach, and additionally knowledge of container configuration and management.

*Test environments enable thorough testing before adoption*

In addition to the production environment, the SEA has two test environments that enable comprehensive testing before deployment (releasing updates in the applications to the production environment). One of the testing environments is a local test environment without connections to external registers and systems, and the other one is a test environment with full services with authentications and connections relevant to

communicate with external systems (i.e. enables testing the full functionality of the SEA applications). The two testing environments are hosted in five additional servers (a single-server solution similarly to the production environment).

Having separate environments for production and additionally for the different stages of testing is generally sufficient for the current needs of the SEA. A more granular approach for the testing stages, such as separating “development testing” and “acceptance testing” could further enhance testing before production.

The SEA IT experts deploy new software versions in the production environment manually. In the test environments, full CI/CD pipelines exist, which are automatic process that drive software development through a path of building, testing and deploying code. Yet, the SEA has decided not to use a similar automated process in the production environment to mitigate risks. A trade-off between the costs and benefits of automation of deployment processes is key in deciding whether to automatise or not. The manual deployment is a good practice in case new software versions are infrequent, such as once in a few months and which is also currently the case in the SEA. If new versions have to be deployed frequently, such as daily, the deployment process should be automatic.

*The servers of the SEA are hosted in external data centres*

All the SEA’s servers are hosted in the common data centre maintained by the State Social Insurance Agency under MoW (i.e. it is a physical storage of servers), and since 2023 partially in the data centre of the Latvian State Radio and Television Centre. The staff in of these external data centres maintains the physical servers and VMware does the virtualisation of the servers, so that the SEA IT staff could maintain the virtual machines. This set-up meets the current needs of the SEA as the approach of centralised data servers reduces the effort required from the SEA to maintain servers, as well as the number of people needing to access the servers, which in turn improves security.

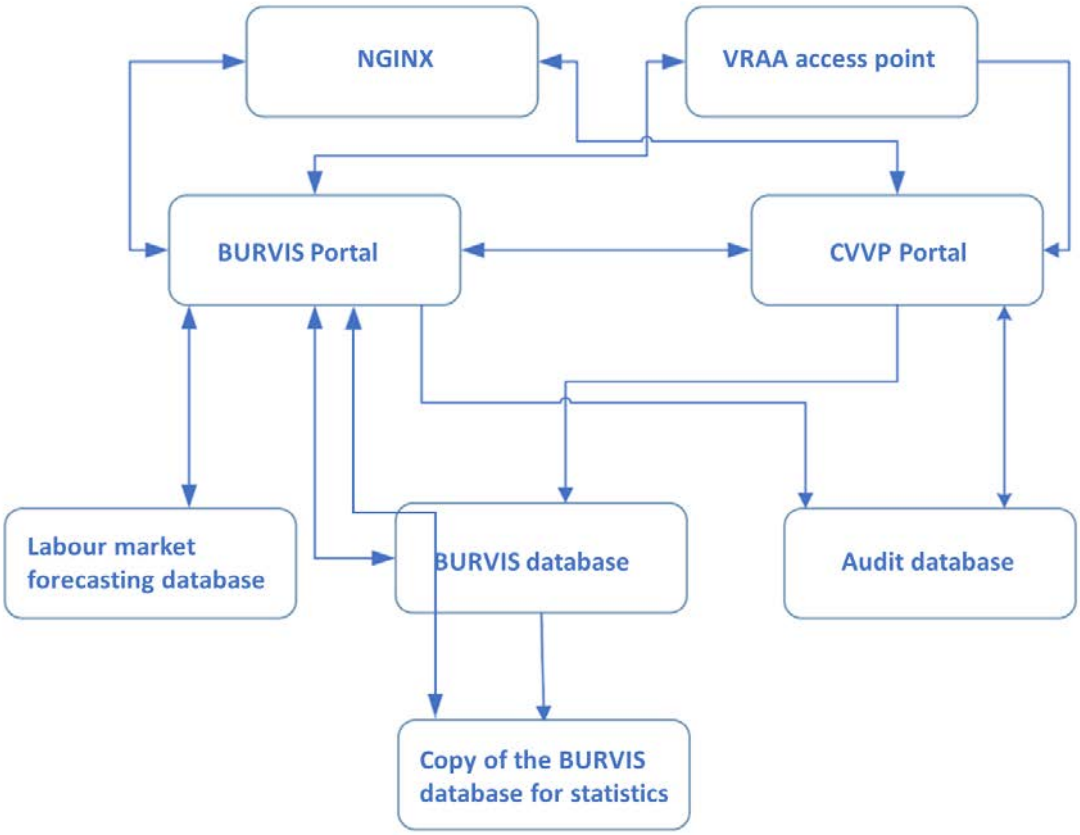
SEA does not currently use cloud services as it has no explicit necessity to host its software in the cloud. Yet, using the cloud services could offer some benefits beyond just hosting applications or servers. For example, some data analytics tools are readily available in the cloud without needing immediate investment in licenses or hardware. The (public) cloud also offers more possibilities for scaling up applications in case this would be relevant for the SEA in the future.

All the SEA servers run in the same network as there is no separation at the network level, which can pose a security risk. If an attacker gains access to any of the server in the network, the attacker also has easier access to the other servers in the network than in the case of having network level separation. Systems with more divided networks (sub-networks) enable to limit such risks.

### *3.3.3. Data exchanges are not fully secure, automatic or meeting the needs of service provision*

Figure 3.2 is depicting the connections between databases and system components in the SEA. The BURVIS and CVVP portals are well connected to most other components in the IT infrastructure of the SEA. The connections to external systems are implemented either directly via the BURVIS or CVVP portals, or via the VRAA access point (service provided by the State Regional Development Agency for the providers of public services in Latvia). In total, the core IT infrastructure depicted in Figure 3.2 have in total 20 interfaces to exchange data, some of which are with external registers or IT systems (user authorisation, addresses database, EURES for vacancy mediation across EU, data from other registers on jobseekers and employers used for service provision), and some with additional internal systems of the SEA (bug tracking, mail, document and accounting register Horizon, website of the forecasting tool), seven external classification systems, and three file sharing solutions.

**Figure 3.2. The BURVIS and CVVP portals are well connected to most other components in the IT infrastructure of the SEA**




Note: DB – database. NGINX – an open source web server in the State Employment Agency. VRAA – the State Regional Development Agency.
Source: Authors' work based on inputs from the State Employment Agency.

Most of the interfaces to enable connections between the different systems are separated to a specific API (Application Programming Interface) layer, but some interfaces access databases directly. Such direct access should in general be avoided as it impacts system security and development. In terms of system security, using a direct access to a database reveals the inner structure of the database, which can disclose information to potential attackers and provide them a direct access to actual data. In addition, such direct connections tie the database structure to the current implementation, making it difficult to change the implementation without affecting the users of the interface. These types of problems are usually mitigated by an API layer (preferably through API Management) which provides an additional layer of security and hides the implementation details, enabling the underlying implementation to be changed if needed while keeping the API the same for the external partners.

Some of the data exchanges are fully automatic as background processes during service provision while some need manual initiation or are launched only daily, monthly or ad hoc. Yet, more automatic processes could make service provision more efficient. For example, during the jobseeker registration process in the BURVIS portal, some data on the jobseeker are automatically taken from external registers via the access point as a background process, while for some information the employment counsellor has to launch the dedicated query. Nevertheless, some of the manual processes have been implemented for data protection reasons, e.g. the query on disabilities is launched only if the jobseeker first themselves tell the counsellor that they have such status.

The SEA has been able to establish data exchanges with many key registers in Latvia to increase the effectiveness and efficiency of service provision. For example, the SEA receives data from the State Revenue Service (data on enterprises, employment data), the State Social Insurance Agency (benefit information, employment data), the Social Assistance Administration Information System (data on social services by municipalities), the Citizenship and Migration Affairs, the Register of Enterprises, the State Land Service, the State Labour Inspectorate, Road Traffic Safety Directorate (data on driver's licences).

The SEA staff has identified further needs for data exchange that have not been possible to implement yet. For example, information on education in the BURVIS database is currently based on what the jobseeker says or provides documents for, but not on the register data that could be received from the Ministry of Education. The register of State Revenue Service includes occupation data, but these are not available for the SEA and thus, again, the counsellors need to rely on information from jobseekers themselves for information on their previous occupations, which makes the process less efficient and the data potentially less reliable.

Establishing new data exchanges is often cumbersome as each new data exchange needs a legal base, a contract between the register owners, and some technical capacity in both sides to implement the data exchange. The latter step in establishing new data exchanges is particularly challenging for the SEA as its development capacity is tied to the limited capacity of the development partner (see Subsection 3.2.5). As the IT infrastructure in the SEA faces a list of improvement needs to increase the efficiency and effectiveness of the SEA services, needs for new data exchanges need to compete with other urgent needs. For example, the data exchange with the Ministry of Education has been already agreed on, but the implementation has not taken place yet due to the limited resources.

### *3.3.4. Programming languages and other technologies do not include legacy systems*

The technology stack of the SEA includes some technologies that are somewhat dated as of Q2 2023. However, as these versions are still supported, the current set-up does not (yet) cause any challenges for the system.

More specifically, the BURVIS and CVVP portals are built in Scala and Java (mostly Java 11, while an interface to external registers via the VRAA access point uses Java 8 for which the release date dates back almost ten years, and the newest version in Q2 2023 is Java 20). The BURVIS database, the copy of it and the audit database are PostgreSQL 13 databases, i.e. use a quite recent version (released in 2020, the latest version of PostgreSQL as of Q3 2023 is PostgreSQL 15). In general, PostgreSQL is a fitting choice for the needs of the SEA and it does not pose any specific risks compared to other database alternatives.

Other technologies in the technology stack of the SEA include: tresql, querease, mojoz, sbt, nginx, angularjs, bootstrap, less, pug, akka, akka-actor, akka-http, akka-stream, coffeescript, jasperreports, bower, npm, grunt, jasmine, node.js, javascript, and bash. All of these are common software development tools and do not create any risk for further development.

## 3.4. Data analytics solution is not supporting efficient knowledge dissemination

Operational IT systems are generally not fit to support data analytics functionality and developing an additional technology stack for that purpose is necessary. This section reviews the technology and practices concerning the data analytics solution in the SEA.

### *3.4.1. The statistics database is not restructured to support data queries*

As data needs for operational functions and data analytics usually differ, data in the operational database are generally not fully fit for data analytics purposes. As such, modern IT systems include additional layers for data analytics purposes, which as a minimum include an ETL or ELT processes (Extract, Transform, Load) and a Data Warehouse or Data Lake solution (a data repository for data analytics purposes), although additional layers might be sometimes relevant for better data management. These solutions enable to prepare the data for analytics purposes via automatic processes (e.g. restructuring, cleaning, processing duplicates, reclassifying and coding, and addressing other data quality issues, as well as linking data from different data sources), making the production of statistics, analysis and research more efficient and effective.

The SEA does not have a dedicated IT solution to prepare the operational data for data analytics, as an exact copy of the BURVIS operational database is used to produce statistics and query data for analytical and research purposes. The copy of the BURVIS operational database is made every night without any modifications, including no changes to the data structure to support queries better.

The current solution does not enable including or processing data from additional sources in the statistics database, as the content of the database is overwritten nightly. Yet, additional data could be relevant for analytical purposes, even if these are not relevant for direct service provision and do not need to be included in the BURVIS operational database. Additional data could for example benefit monitoring and evaluation of ALMPs in terms of using a wider range of data on the labour market outcomes for the jobseekers.

Updating data by overwriting these in both the BURVIS operational database and the statistics database means that it is not possible to observe possible changes in some of the characteristics of specific jobseekers in time within the statistics database. For example, over time a jobseeker can attain a higher education level, they can change their geographic location and the SEA branch they visit, they can learn new languages and gain new IT certificates, etc. Yet, in the operational and statistics database, only the last value of these variables is available, which can limit or compromise some types of analyses (e.g. when the characteristics of the jobseeker at a certain point of time are relevant, and not only at the most recent values for these, such as when conducting counterfactual impact evaluations of ALMPs). The changes in data are recorded in the log data in the audit database, but this is not available for the statistics department and would be even less fit for statistics purpose than the BURVIS database.

The statistics department has worked around the issue of overwritten data by saving the monthly key outputs of personal level queries in Excel files externally of the statistics database. This enables the statisticians link the different Excel files to see changes in jobseekers' characteristics. However, the practice raises additional concerns regarding data protection (processing personalised data and saving these externally from the dedicated database, i.e. also the access to the respective server and folders need to be at least as restricted as the main statistics database). In addition, the changes are not always traceable in case the ID code of the jobseeker changes. For example, a change in the regulation in 2017 enabled Latvian citizens to receive a new ID code that would not contain their birthdate (Office of Citizenship and Migration Affairs, 2020[6]).

Despite the shortcomings of the statistics database, the current solution is better than querying data directly from the operational database, as currently statistics production does not interfere with the capacity and functionality of the operational BURVIS system, while still enables to use up to date data for statistics. Furthermore, building such a system has incurred less expenditures for the SEA compared to a fully-fledged modern data analytics system.

### *3.4.2. The solution for querying data for statistics and analysis is limited and inflexible*

Modern solutions for data analytics include Business Intelligence (BI) tools that enable retrieving data from the Data Warehouse or Data Lake solutions, as well as analyse, transform, present and report data, including via data visualisation. BI tools facilitate automating routine data processing for statistics and analysis, as well as disseminate data via interactive tailored dashboards for different user groups.

The SEA has not adopted a BI solution for statistics purposes, but has developed SQL queries within the BURVIS portal that staff in the statistics department can launch. The staff has limited flexibility to adjust the criteria of the built-in queries (above all the dates to establish the time interval for data to be queried) and has developed some capacity to create elementary new queries, although the external developing partner is mainly developing and adjusting the built-in queries. The capacity of the external developer is limited (also as other types of developments often take priority), but some adjustments of the queries have been possible over the years to accommodate changed needs for statistics.

The built-in queries in the BURVIS portal return individual level data tables in (large) MS Excel files, i.e. the queries do not enable aggregate statistics reports or data visualisation. All data processing to produce statistics and analysis takes place thus externally from the SEA IT infrastructure, in MS Excel. The statistics department applies manually essentially the same methods to derive the regular statistics products each month, quarter and year. Thus, the current solution is inefficient due to low level of automation, ineffective due to low flexibility to query data, and error prone due to high level of manual processing.

As the data in the statistics database are not optimised for data analytics purposes (see previous section), all relevant computations have to be made during the query process. This set-up makes the queries slow, and it would be even more problematic in case aggregates and visualisations would be implemented within the same set-up. In such case, many calculations would need to be made repeatedly, even for more historic data. As the volume of BURVIS database increases, these calculations would get slower over time and require more computing power.

Due to the inflexible set-up of the data analytics solution and its functionality to only produce MS Excel tables with individualised data, the solution is accessible mostly for the staff in the statistics department and not all user groups in the SEA that would need analytical information. The data visualisations and reports compiled in MS Excel might suffice the key needs for information for the SEA management, but not the needs of the SEA branch offices that need more granular and up to date information. For example, the SEA offices would like to see the workload of their office by counsellors to manage the distribution of workload actively. The counsellors would like to have the up-to-date overviews of their portfolios of jobseekers. Currently, the counsellors can only query their clients (jobseekers, employers) to look up their details in the BURVIS operational database, so even compiling lists of jobseekers that could be invited to an event of the SEA have to be prepared by the SEA statistics unit.

### *3.4.3. The SEA's statistics department makes a lot of effort to share data and statistics with external parties*

To share statistics and data with external stakeholders, the only automatic data exchange is currently set up between the BURVIS operational database and the database of the Labour Market Forecasting Portal, enabling sharing aggregate data via an API solution (see Section 3.4.4). All other automatic data exchanges within the SEA IT infrastructure serve the purposes of operational needs, either of the SEA or the external partner.

As such, all needs for statistics and data of external stakeholders are catered by the statistics department in the SEA manually, by querying data from the statistics database (copy of BURVIS operational database), exporting the data to MS Excel, processing the data as relevant, and sharing the output with the respective stakeholder. The same process is performed for example for both regular and ad hoc needs of MoW, the Ministry of Finance, as well as to share data with researchers. The same approach is used also regardless

of whether the data need to be on personal level (with Latvian ID codes or anonymised) or aggregates, raising data security concerns in addition to inefficiencies.

The SEA's statistics department also sends the data manually to the data analytics system called the Unified Welfare Information System (LabIS), owned by MoW. LabIS entails a database that includes personal data from different registers under MoW (welfare, social insurance, data on jobseekers and vacancies from the SEA, etc) and enables producing statistics based on data linked across the registers via the Latvian ID codes using a BI tool (SAP BI). Although the data are linked using the Latvian ID codes during the data loading process, the ID codes are replaced by unique identifiers in an additional step and not made available to the users in LabIS.

In total, the SEA's statistics department shares every month 27 different MS Excel files with MoW to be used in LabIS. After extracting the relevant data from the copy of the BURVIS database, the statistics department processes the data to make these fit for the needs of LabIS. For example, the BURVIS database does not include data fields for the region or aggregate level education codes (only more granular address data and education data respectively), and the statistics department adds the corresponding information manually. This procedure is inefficient, and more error prone compared to conducting such data processing automatically within a solution containing a data warehouse and a BI tool, for example in the already existing LabIS solution by MoW.

Although the SEA is an important contributor to LabIS, the data in this analytics solution is broadly not usable for the SEA and only one statistician from the SEA has access to LabIS currently. The data content is generally too historic for the statistics purposes of the SEA (essentially with a lag of one month), largely because of the manual processes by the individual registers to deliver the data to MoW, which is time consuming.

The SEA is also obliged to share additional aggregate statistics with MoW weekly and monthly in MS Excel files, regardless that the SEA makes these statistics available publicly in its website, as well as shares the underlying individual level data for LabIS (which thus could enable any relevant aggregate statistics through LabIS). These files contain tables that include filters and drop-down boxes, as well as built-in figures to increase interactivity and user-friendliness of the files.

Although the current IT infrastructures of the SEA and MoW do not support the statistics department of the SEA sharing data and statistics with external partners sufficiently to maximise efficiency and security, the statistics department has been successful in finding solutions to work around the limitations and disseminate knowledge. For example, the SEA was quick to establish new relevant statistics products during the outbreak of the COVID-19 pandemic, as well as in the beginning of the refugee crisis caused by Russia's war of aggression against Ukraine. Also, the SEA has effectively shared data for the evaluations of ALMPs that have been conducted by the Ministry of Finance, as well as the OECD (2019[7]).

### *3.4.4. The Labour Market Forecasting Portal enables disseminating knowledge interactively*

Although the IT infrastructure of the SEA does not include modern data analytics solutions to support the production and dissemination of statistics in general, a dedicated interactive digital tool has been developed over 2016-22 to disseminate labour market forecasts – the Labour Market Forecasting Portal https://prognozes.nva.gov.lv (LMFP). The LMFP was developed by the SEA in co-operation with the Ministry of Economics to share the short-term labour market forecasts of the former, and the medium-term and long-term forecasts of the latter. The development of this digital tool was possible as it received funding from the European Social Fund and the European Regional Development Fund and was prioritised in the SEA strategy (see Section 3.2.2).

The LMFP aims to support anybody needing to take decisions that require insights on labour market developments, such as jobseekers, students and schoolchildren that have to make career choices or

employers making decisions on human resource planning. Furthermore, the portal supports ministries and other public sector agencies by providing the labour market information for policy making and policy implementation, including for the staff in the SEA to be able to advise jobseekers and employers.

The LMFP focuses on key information relevant for its wide audience, i.e. above all long-term forecasts of general labour demand and supply, and shorter-term forecasts of labour demand by occupations and skills. The information is visualised on a few main dashboards, enabling the user to apply a few basic filters, order information and search for specific information (find information for a specific type of skill or occupation). As such, the interface allows some interactivity for the public users.

The database of the LMFP contains only aggregate data on different labour market indicators. Some of the aggregate data from BURVIS are exported monthly to the LMFP via an interface. Most of the data for the database of the LMFP are prepared in MS Excel, i.e. the forecast values for the different labour market indicators are prepared externally from the LMFP platform using econometric modelling and subsequently uploaded to the database. In addition to statistics from BURVIS and the forecasts by the Ministry of Economics and the SEA, the LMFP benefits from complementary information, such as statistics on unemployment and statistics on salaries from the State Revenue Service.

## 3.5. The processes and practices in the SEA do not ensure high data quality and security

This section discusses the key practices and processes in the SEA to ensure that the IT systems are resilient and secure, and that data processing complies with data protection requirements and supports the SEA's service provision and statistics production with high data quality.

### *3.5.1. Backup management is partly a side-product of statistics production*

The backups of applications (stored in servers) are made using Veeam, which is a commonly used and accepted virtual server backup system. Using Veeam is a good approach for the SEA, as it can create snapshots which are easy to restore, for example when implementing system updates or installing updates to underlying operating systems.

The backup of BURVIS operational database is created every night by taking a database dump and restoring it immediately as a new database for statistics purposes (Section 3.4.1). The process of copying the BURVIS database also serves the purpose of a backup verification process. In general, very often database (and other) backups are not tested regularly, but in the case of the SEA at least a rudimentary restore testing is carried out every night. However, other databases of the SEA are backed up irregularly, which may cause information loss. To make a decision on the usefulness of implementing more frequent backups of the other databases, the risks of information loss need to be compared with the cost of more frequent backups.

### *3.5.2. Data quality management is mostly manual*

The BURVIS interface includes somewhat limited data validity and integrity checks implemented directly in the system (e.g. classifications and built-in controls for data fields), and a substantial part of data quality management takes thus place manually. A data quality administrator in the statistics department is the main staff member to identify data quality issues, as the statistics department accesses the functionality to query personal level data, regardless that the query would not be for statistics and research purposes. Each week, the data quality administrator queries a different set of personal data to search for errors and missing data using MS Excel. Also statisticians run data quality checks in case they have temporary capacity to do so. The identified data issues are then shared with the respective branch offices of the SEA

together with instructions to address the data issues. This process contributes to a higher data quality and integrity for operational purposes, as well for statistics and research purposes. Furthermore, the statistics unit checks the (past erroneous) data again, and resends the errors to the branch offices if necessary, before using these data for statistics publications.

The volume and diversity of errors identified in the manual data quality checks are substantial, and involve all different sections in the BURVIS system – jobseeker registration, vacancy registration, provision of ALMPs. In addition to simply missing values in the data fields, some values do not match the content or legal criteria. For example, people in retirement age are not eligible to be registered as unemployed, yet have appeared in the quality checks. In terms of vacancies, the current approach requires to use ESCO codes, but the previously used classification appears in the data. The ending dates of ALMPs do not appear automatically in the process and need to be manually inserted by the counsellors, leading to often missing dates. Errors and missing data appear also as some of the data (updates) from external registers need to be manually queried, but the counsellor has failed to launch the queries. All these examples of errors could be avoided by implementing built-in controls in the BURVIS portal, thus not requiring manual quality checks or the data correction processes.

While the SEA has recognised the inefficiencies of the current data quality management, implementing better data quality checks within the BURVIS portal has not taken place due to limited resources and capacity of the development partner (Section 3.5.2). As adding additional features in the BURVIS portal was assigned higher priority in the list of necessary IT developments in the SEA, the manual process involving staff in the statistics department was chosen.

Although it is good that the SEA had the possibility to work around the capacity constraints of IT development and still implement data quality control, the solution also raises data protection issues and process effectiveness questions in addition to efficiency concerns. In the current set-up, staff in the statistics department accesses personalised data for quality checks, which could be avoided in automatic built-in quality controls. The manual quality checks might also not be able to detect all issues that an automatic process could, and as fixing the identified issues is also manual, the process is still error prone.

### *3.5.3. System and data security is prioritised, but not sufficiently*

System and data security are rightfully considered important in the SEA. The SEA organises system security auditing annually via an external assessor, which identifies potential issues and bugs, and reports these back to the SEA. While most of the issues tend to be minor, the process has enabled to also identify some critical security issues in the past years. The IT development partner of the SEA is subsequently tasked to eliminate the identified issues.

In terms of compliance with the General Data Protection Regulation (GDPR) of the EU, the last audit from 2021 identified 16 issues in the BURVIS system that would need attention from the SEA. The main issues concern ensuring clearer and leaner roles, purposes and processes of processing personal data, anonymising and archiving historic data (these processes are missing fully, see Section 3.3.2), and providing the data subjects (clients) with full information regarding the processing of their personal data. However, the SEA aims to address only about half of the identified issues partially or fully in the near future (or has already done by Q2 2023), as several of the recommendations need more substantial changes in the BURVIS system in the context of very limited resources for such developments.

In terms of high-level security management, the SEA manages staff access to personal data and functionality in BURVIS via a central directory of users (Active Directory) to ensure that user rights correspond to the work tasks. In addition, improvements in data security and data protection are highlighted in the SEA's strategy for 2021-23 (Nodarbinātības valsts aģentūra, 2021[4]). As one of the measures to mitigate the system security risks, the SEA foresees regular staff training on cyber security in its strategy.

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Office of Citizenship and Migration Affairs (2020), *Change of the personal identity number*, Office of Citizenship and Migration, https://www.pmlp.gov.lv/en/change-personal-identity-number?utm_source=https%3A%2F%2Fwww.google.com%2F. [6]

## Notes

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R1724&from=EN.

[2] The other two main objectives concern the integration of persons with disabilities into the labour market, and the implementation of the SEA's human resource policy in accordance with contemporary trends in human resource management.

[3] BURVIS information system is regulated by the Regulation of the Cabinet of Ministers No. 172 from 28 March 2017 "Regulation of the information system for the registration of unemployed persons and registered vacancies".

# 4 Digital tools at the State Employment Agency

Digital tools can allow public employment services (PES) to be more effective and efficient. Such tools can enable PES to better meet the needs of their clients, including employers, jobseekers, and those at risk of unemployment. Indeed, such tools can free up resources for PES to support other areas of active labour market policies (ALMPs). This is particularly important in Latvia's context where spending on ALMPs is low compared to other OECD countries. This chapter describes and assesses the current digital tools used at Latvia's State Employment Agency (SEA). It focuses on the SEA's jobseeker profiling tool that helps identify jobseekers' distance from the labour market, the vacancy matching tool that supports employers and jobseekers, and the plans to introduce skills profiling tools.

## 4.1. Introduction

PES specific digital tools can help PES to better support employers, jobseekers and those at risk of unemployment. Such tools can also free up resources, such as by saving counsellor's time, which can then be redirected to other activities. PES specific tools differ from more general digital tools in that they offer functionalities that are only relevant to PES. This chapter describes and assesses the key PES specific digital tools used at the SEA. Specifically, it covers the profiling tool and the vacancy matching tool as well as the SEA's needs and current plans for a skills profiling tool. The high-level IT infrastructure, data analytics and visualisation tools, and the associated practices and processes are covered in Chapter 3.

In recent years countries have made great strides in making use of digital tools (OECD, 2022[1]). Such tools can offer a range of different digital functions to meet the needs of jobseekers, employers, and PES staff. For jobseekers, functions can include online registration, CV creation, skills testing, career guidance, virtual training, access to job vacancies, and provision of information on PES services including through tools like chat bots. Employers might have access to features that allow them to find employees, post job advertisements, receive advice, apply for training incentives, and share information on filled positions. Finally, PES staff can use tools to access information on jobseekers, conduct job seeker profiling, manage individual action plans, match job seekers with employer vacancies, and supervise service providers.

The IT systems of the SEA support almost all of these functions (Annex A provides a full overview). There are a few functions that do not exist in Latvia, including some more advanced vacancy matching features and skills profiling systems. However, simply digitalising these functions is not sufficient, it is important that these tools are optimised meet the needs of users as effectively as possible. This chapter thus provides a detailed assessment on the design and implementation of the digital tools supporting the core service delivery in the SEA. In particular, the chapter focuses on the SEA's jobseeker profiling process, the vacancy matching platform, and the SEA's future plans to improve skills profiling.

Section 4.2 looks at the SEA's profiling tool. This tool divides jobseekers into three categories from closest to furthest from the labour market. However, the tool is manual, it takes time for counsellors to fill in and does not take advantage of existing data and does not leverage analytical techniques (like machine learning or regression analysis) to provide an evidenced-based assessment of jobseekers' prospects. Section 4.3 turns to the SEA's vacancy matching platform. The platform uses relatively simple filters to allow jobseekers and counsellors to search for vacancies, while counsellors can see which jobseekers match a particular vacancy. While this platform does help meet the needs of the SEA clients, it could do so more efficiently especially with more automation. Lastly, Section 4.4 looks at the SEA's plans to implement digital skills profiling. The SEA currently only collects very basic self-declared information on jobseekers' skills and is in the process of implementing new skills profiling tools that will better support counsellors to understand their clients and jobseekers to understand themselves.

## 4.2. The SEA uses a basic tool to profile jobseekers that could be improved

All PES have clients with varying levels of need and distance to the labour market. Profiling allows PES to understand these needs and levels of job-readiness. Profiling can take several forms, from relying only on the judgement of caseworkers through to statistical profiling models that leverage rich administrative data and sophisticated analytics to estimate a jobseeker's distance to the labour market (see Box 4.1 for a discussion of the different profiling approaches). The SEA uses a "rules-based" profiling tool: counsellors collect information on jobseekers "risk factors" through an interview, the risk factors are then counted, and jobseekers are divided into three groups from most to least job-ready based on the number of risk factors they have. This section describes and assesses this profiling tool.

### *4.2.1. The SEA uses profiling to inform service provision by grouping jobseekers based on their job-readiness*

Profiling is part of the initial registration process at the SEA. Its purpose is to gauge the distance of jobseekers from the labour market, which informs service provision. The current profiling system was introduced in 2019 to replace an older system that was not meeting counsellors' and jobseekers' needs.

Figure 4.1 illustrates the SEA's profiling process and Annex B shows a screenshot of the profiling tool which is in the form of a spreadsheet. Profiling occurs during the jobseeker's first interview, which the SEA aims to conduct within 30 days of registration as unemployed. This interview collects data on risk factors, which span a range of areas including demographic information (e.g. being under 18 or over 50), employment history, skills (including qualifications), care responsibilities, social issues (like addiction or criminal history), health, and motivation.

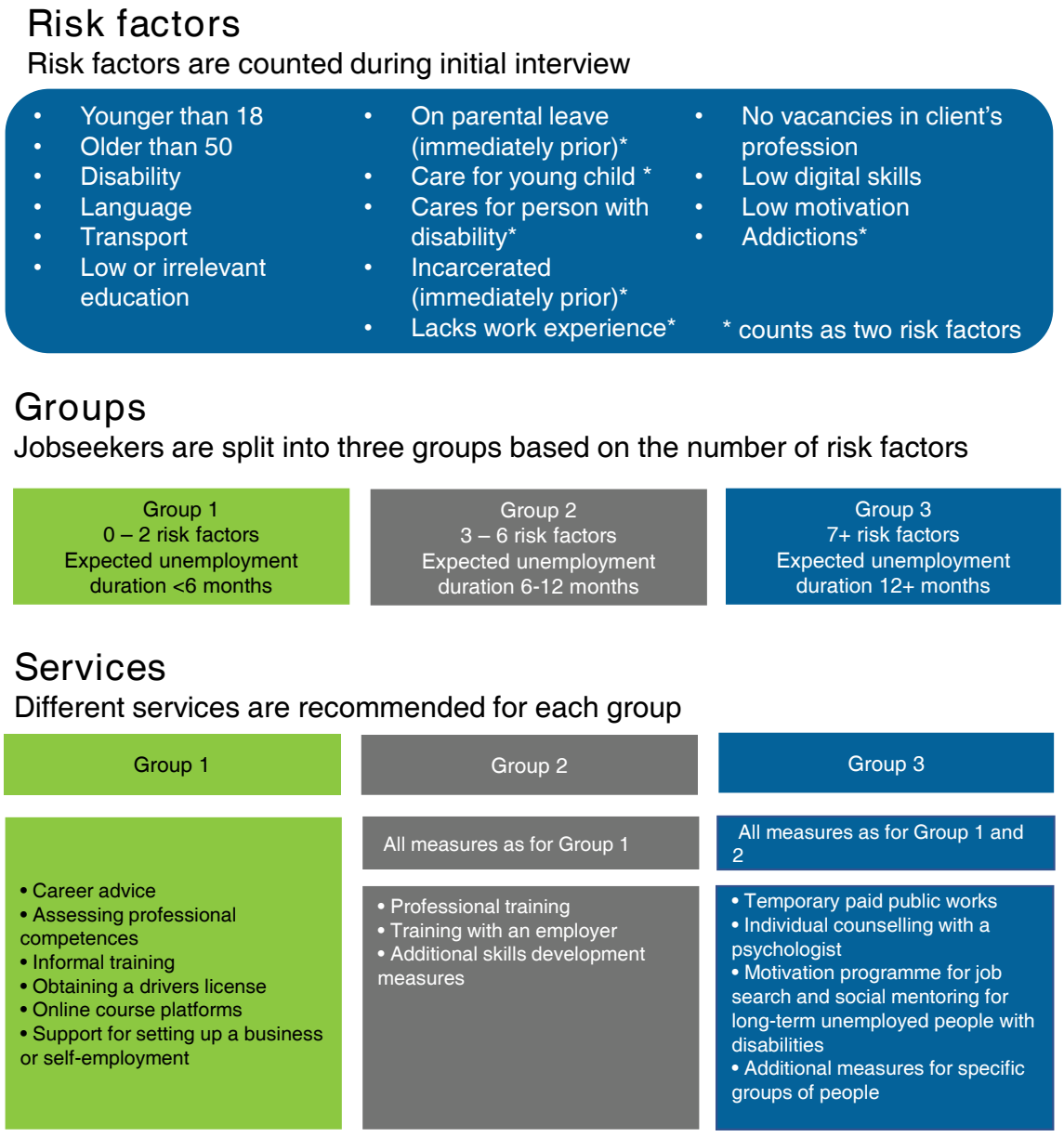
Most of this information must be collected in the interview and is not contained in the information system of the SEA called BURVIS. There are only a few exceptions. Age and disability data are held in BURVIS, and for the subset of jobseekers who have uploaded CV information at the time of profiling there are data on their stated education, language skills and preferred occupation. However, even in these cases such data are not linked to the profiling tool (i.e. no data are linked to the profiling tool, although for variables like age, and disability etc., they can be looked up by the counsellor in the BURVIS system). Thus, even when the data do exist in BURVIS, as the data are not linked to the profiling tool they are not in practice very useful for profiling. For example, given the counsellor is already interviewing the client, there is not much time-benefit (or even a time loss) to the counsellor pausing the interview to look up information on the client in BURVIS and then manually entering it into the profiling tool (i.e. the spreadsheet), compared to simply asking the jobseeker to re-supply the information (e.g. asking the client their age, alongside the other questions which must be asked anyway as no such data exist in BURVIS).

Once the form has been filled out, the risk factors are then tallied, and clients are segmented into three groups based on the total number of identified risk factors – with some risk factors counting for double. For example, if a person is aged over 50 (counts as one risk factor) and cares for a young child (counts as two risk factors) and has no other risk factors, then this person has a total of three risk factors and is classified in group 2 (3-6 risk factors see Figure 4.1). Those with two or fewer risk factors are placed in the most job-ready group, those with three to six risk factors in the medium group, and those with more than six risk factors in the least job-ready group. Counsellors also have the right to place jobseekers in a different category from the one that corresponds to the number of their risk factors if they deem it necessary. About half of clients are classified as most job-ready with a little over a third in the middle category and about 10% in the group farthest from the labour market (data are from Q3 2019) (SEA, 2020[2]).

For clients with disabilities, a separate questionnaire is administered to gain a more comprehensive understanding of the person's health issues. This questionnaire collects information about suitable work hours (e.g. total hours, need for breaks), remote work possibilities, and appropriate or inappropriate conditions (e.g. working outdoors, loud environments, work with chemicals, fast-paced or monotonous work, etc.). This survey is voluntary, and the jobseeker is not obliged to complete it.

A different set of services is recommended for each of the three groups, which informs the drawing up of an individual action plan for the jobseeker. Those further from the labour market have a wider array of services such as training or participation in public works schemes that may be recommended. These services are only recommended, providing counsellors with flexibility to deviate if necessary, though those in higher risk groups have been found to get more services (SEA, 2020[2]). If a jobseeker is profiled as low risk but has not found employment after many months, the jobseeker is not "re-profiled" into a different group, but rather the counsellor will be aware of the lengthening unemployment spell and the action plan can be updated.

**Figure 4.1. Profiling at the SEA**




Source: OECD illustration based on information from Latvia's State Employment Agency (SEA).

### *4.2.2. The SEA's profiling system replaced an earlier needlessly complicated set up*

The current profiling system, introduced in 2019, is a significant improvement on the previous model. The prior profiling system was needlessly complex, dividing jobseekers into no fewer than 39 different groups (Table 4.1). Such a system was unwieldy to use, making it challenging to understand and explain the classification. The OECD recommended that this system be replaced by a more practical one (OECD, 2019[3]).

The current system dramatically streamlines this by reducing the number of groups to three. Additionally, the three groups follow a logical structure (most to least job-ready), using a simple and thus easy to understand algorithm to classify job readiness (simple tally of risk factors). This makes the profiling transparent and easy to understand.

One advantage of the previous profiling model, however, was that it made partial use of statistical profiling. That is, the profiling incorporated a statistical model that linked the characteristics of clients to the outcomes of similar clients in the past. This was partial statistical profiling as the tool used statistical profiling to group jobseekers by likelihood of finding a job, but the final classification also separated groups further based on their self-assessed skills and counsellor-assed motivation to arrive at the 39 different groups (OECD, 2019[3]). Statistical profiling is a key element of a modern profiling set-up (Box 4.1). However, SEA's previous profiling system was so complicated (especially due to the 39 groups) that it was not useful for counsellors (SEA, 2020[2]). Moreover, the SEA had outsourced the model to an external provider. While outsourcing such expertise can be a sensible approach, in the experience of the SEA with the provider, the model was not able to be updated when needed and the SEA felt the model was out of date with respect to recent changes in the labour market. Ultimately replacing the previous tool was sensible given its lack of useability (SEA, 2020[2]; OECD, 2019[3]). However, the failings of the previous tool should not condemn statistical profiling *per se*, an approach which other countries have used with more success (OECD, 2018[4]). Rather the previous profiling tools shortcomings reflect implementation challenges (such as a poor experience with the provider) and other issues which are not limited to statistical profiling. Solutions to these potential issues are discussed below.

### Table 4.1. The previous profiling tool used statistical profiling but could not be updated and divided clients into too many groups

Comparison of current and previous profiling tool

| Feature | Old profiling tool | Current profiling tool |
|---|---|---|
| Year introduced | 2013 | 2019 |
| Linked to data in BURVIS? | No | No |
| Used statistical profiling to link data on jobseekers to outcomes of previous clients with similar characteristic? | Yes (partially) | No |
| How many profiling groups? | 39 | 3 |
| Well understood by jobseekers and counsellors? | No | Yes |
| Model maintenance outsourced to private provider? | Yes but in practice the tool could not be updated as needed | No/Not applicable as no statistical model |

Source: OECD compilation based on information provided by the SEA and in OECD (2019[3]), *Evaluating Latvia's Active Labour Market Policies, Connecting People with Jobs*, https://doi.org/10.1787/6037200a-en.

### *4.2.3. Despite improvements the current profiling tool could be automated and make more use of evidence and data*

While the simplification from the previous model is a positive development, the profiling tool still has several shortcomings. Most notably, it is a manual process and its measure of distance to the labour market is not data-driven, which could compromise accuracy.

### *Inputting profiling information manually is time consuming and does not allow data to be reused easily*

The manual process of counsellors filling out a spreadsheet to count risk factors is not a modern and efficient approach. Firstly, it is time-consuming, requiring counsellors to spend part of the first interview with the client asking questions in order to fill out the form. While some questions, the counsellor can refer to the SEA's BURVIS information system this is not likely to save much time as the counsellor would have to copy manually the data into the Excel sheet for the profiling. Indeed, the remote online registration process collects some of the necessary profiling information digitally, which would facilitate the automation of filling in and processing profiling information.

Secondly, a manual process is potentially error-prone – e.g. if the number of risk factors is miscounted or if some risk factors are mistakenly missed. In contrast, an automated system could implement quality control checks that automatically detect errors and could potentially update or cross-verify information if data are updated in BURVIS.

A key drawback of the existing approach is not only that data entry is a manual task, but that its efficiency is scarcely better than a paper-based method. There is streamlined method for transferring the information from the Excel sheet into BURVIS, undermining what could be a key advantage of a digital solution. This means that the information gathered during profiling is not stored in a way that can be systematically searched digitally and used in later analytics. Only the final profiling score is retained in BURVIS, but the risk factors themselves – and therefore the reasoning behind the counsellor's decision – are not well captured. Not properly integrating the risk factor data to BURVIS misses an opportunity to curate data on individuals that could be useful later. For example, in research and monitoring, detailed information on risk factors would enable the SEA to better understand outcomes (such as unemployment duration, likelihood of finding employment, and earnings among others) for different groups, the quality of services provided to them, and the effectiveness of these services and programmes (in the case of counterfactual impact evaluations). Such individual information might also be better presented to counsellors through data analytics and visualisation tools, aiding counsellors to better understand their portfolio of clients and the SEA management to better understand the distribution of risk factors identified.

The SEA recognises the need to automate profiling. An internal report in December 2020 recommended changes to BURVIS to automate aspects of profiling (using the information on risk factors already held in BURVIS), with the option for counsellors to further add and amend information (SEA, 2020[2]). However, due to resource constraints, these changes have yet to be implemented.

### *The SEA's model is not data driven or as accurate in predicting unemployment duration as it could be*

The current "model" part of the profiling system – i.e. simply counting risk factors for longer unemployment duration – can be classified as an arbitrary rules-based algorithm. While this method is easy for counsellors to understand, it does not necessarily provide an accurate prediction of jobseekers' unemployment duration.

For instance, by counting the number of risk factors, each risk factor is arbitrarily assigned a weight of one (or two in cases where the risk factor counts double) without quantifying the empirical link between the risk factor and unemployment duration. It seems improbable, for example, that lacking Latvian language skills, having a child under pre-school age, and lacking digital skills represent the same risk of a long unemployment spell. Nor does it seem likely that those recently released from prison have similar employment prospects to those returning from paid parental leave or to someone who has never worked.

Indeed, during the introduction of the profiling scheme in 2019, an internal study of its effectiveness was conducted (SEA, 2020[2]). This study identified inaccuracies in the profiling model – noting that many people in each group found a job earlier or later than expected. As the study found that on average jobseekers found a job sooner than anticipated, the study recommended that the number of risk factors needed to qualify for a more disadvantaged group be increased. As a result, the cut-off for group three was raised from 6 to 7 risk factors, but this was an ad hoc approach and still treats risk factors with a weight of only 1 or 2 and does not account for interactions and interdependencies among risk factors and other variables.

An alternative approach would be to use a data-driven model, as is the case in many other OECD and EU countries that perform statistical profiling (OECD, 2018[4]; Desiere, Langenbucher and Struyven, 2019[5]) and as was used previously but ineffectively in Latvia (see Section 4.2.2 above). Such a data-driven approach can be expected to perform better and deliver more accurate predictions than the approach that the SEA currently uses which is not linked to data, with many countries achieving a high-degree of accuracy (Desiere, Langenbucher and Struyven, 2019[5]).

Of course, statistical models are not without their own limitations and, as discussed in Section 4.2.2, the SEA's previous experience with statistical profiling highlighted several shortcomings. In particular the model was opaque and not found useful by counsellors, while there were also issues keeping the model up to date and accurate. Each of these shortcomings could be addressed with a different implementation approach.

For example, to ensure the model is up to date with the latest labour market trends, the model could be designed in a way that it can be easily updated by the SEA (without a private provider's support), such as by designing the model so that it automatically re-runs regressions (or a machine learning algorithm) on the latest data. However, this would require that recent data on jobseeker's outcomes and characteristics can be provided to the model – as would also need to be done when relying on an external provider. Alternatively, funding could be allocated to regularly re-estimate the model using recent data and an agreement reached with a private provider.

To ensure counsellors understand and use the tool adequate training, guidelines, and systematic user support should be provided. Indeed, any new profiling tool should involve counsellors in the development, testing, and roll-out phase (Desiere, Langenbucher and Struyven, 2019[5]). Effective engagement with counsellors in these ways could avoid another major issue the SEA had with its previous tool, namely that tool was not well understood or useful for counsellors.

### Box 4.1. Many countries make use of statistical profiling tools to support jobseekers

Many countries use statistical profiling tools to help deliver PES services more efficiently (Desiere, Langenbucher and Struyven, 2019[5]; OECD, 2018[4]). Such tools use a data driven and evidenced-based approach to understanding how far a jobseeker is from the labour market.

#### Types of profiling

All PES work with clients who have varying needs and who are at different levels of job-readiness. To allocate resources effectively, PES use various forms of profiling, but not all of them use statistical profiling. Indeed, there are several different types of profiling including:

- Caseworker judgement – relies on the judgment of caseworkers to assess needs.
- Rules-based profiling – uses eligibility criteria (e.g. age, unemployment duration etc.).
- Statistical profiling – uses a statistical model to predict disadvantage.

The advantage of statistical profiling over rules-based profiling and caseworker judgment is that it makes use of evidence and data (most often employment duration or probability of finding employment over a set period – e.g. the next six months). Caseworkers and such models can complement each other with the model informing caseworker decisions who may deviate from the profiling score if they think it is warranted (e.g. if they observe aspects of a clients situation not captured by the model).

#### Leveraging analytics and linked administrative data

A profiling model aims to summarise a client's situation and so requires a comprehensive picture of the client's background. This requires data from many sources. While much useful information is held by the PES (e.g. demographic information and basic labour market histories captured during profiling), linking in administrative data from other agencies (e.g. on benefit histories, rich employment histories, and health to name a few) can provide an even more complete picture without the need for further questioning of jobseekers. The use of such linked data reduces the need for questionnaires, saving time for jobseekers and potentially counsellors if they administer the questionnaires.

While rich data form an excellent foundation for profiling, evidence-based profiling requires analytical solutions to accurately measure how far a jobseeker is from the labour market. Commonly PES will use such data to predict employment outcomes based on previous jobseekers' experiences. Such models can look at the complex association between clients' characteristics and outcomes. Statistical models that do this include regression-based analysis, or more sophisticated methods such as machine learning models, with different PES trying different models.

Source: Desiere, Langenbucher and Struyven (2019[5]), "Statistical profiling in public employment services: An international comparison", https://doi.org/10.1787/b5e5f16e-en; OECD (2018[4]), *Profiling tools for early identification of jobseekers who need extra support*, http://oecd.org/els/emp/OECD-Profiling-policy-brief-DEC-18.pdf.

## 4.3. The SEA uses a rules-based digital tool to help match jobseekers to vacancies

### *4.3.1. The SEA holds data on jobseekers and vacancies, with many vacancies added manually by counsellors*

The SEA maintains a database of both jobseekers and vacancies. Data on jobseekers are collected largely during the registration, the initial interview process and through updates to the jobseekers' profile in the online CV and Vacancy Portal (CVVP). Data on job vacancies are provided by employers. Employers can list vacancies directly on the SEA's CVVP which helps automate the process, however around half of vacancies are shared with the SEA via email or phone. In such cases counsellors must manually enter information on the vacancy into the system. State and local government authorities must list their vacancies with the SEA, however there is no requirement that private sector employers do so unless the vacancy is filled with a third-country national (i.e. individuals from who require a work permit to become employed). In such cases, the vacancy must have been listed with the SEA for at least 10 working days in order for the local workforce to potentially apply.[1] The SEA's vacancy database performs well at attracting vacancies. It is the largest in Latvia, with vacancy stock varying from around 18 200 to 26 600 in 2021 (with the trough in Q1 during Northern winter, and the peak in Q3 during Northern summer) or around 80% of the total vacancies in Latvia reported by Latvia's central statistics bureau (European Commission, 2023[6]). Good outreach to employers is crucial to help meet their needs, maintain engagement, and to ensure employers continue to list their vacancies with the SEA.

Many employers advertise relatively lower skilled jobs with the SEA. The SEA would thus ideally like to attain more high skilled vacancies. This can be helpful both in increasing the availability of jobs to jobseekers and ensuring there are no stigmas or stereotypes associated with jobseekers registered at the SEA – i.e. that the SEA has a good reputation for filling vacancies at a range of skill levels.

### *4.3.2. Simple rules-based filters support matching*

Counsellors and jobseekers can browse vacancies and use filtering criteria to find vacancies. Figure 4.2 shows a screenshot of the vacancy matching portal available to jobseekers. Available criteria for matching include key word search, salary, industry (listed as "scope" in Figure 4.2), type of employment (e.g. indefinite contract, fixed term contract, among other contract types), location, company, application closing date ("current until"), remote working options, whether the job is seasonal, and whether it involves travel abroad. Jobseekers may also search for vacancies based on geographic location, through an interactive map. If a jobseeker is interested in applying for a vacancy, the contact details are listed allowing the jobseeker to directly apply for the job (except in rare circumstances where the employers mark the contact details as private, and the jobseeker must apply for the vacancy through the SEA). The job searching space withing the CVVP portal is open (anyone can access it) making it available for jobseekers who may not be registered as unemployed (for example those who are working and looking to change jobs). Indeed, jobseekers do not need even to create a profile to access this information.

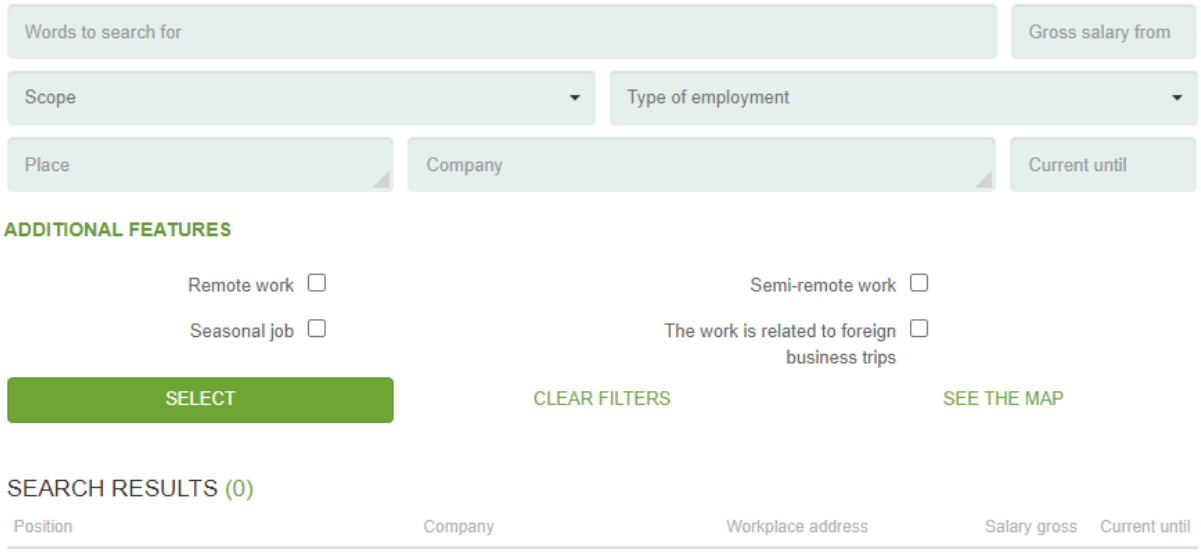
While this system is simplistic in comparison to some of the more advanced matching algorithms available in other countries, the vacancy matching tool does supports counsellors to quickly identify the clients that are best placed to fill a vacancy. Counsellors can then present a shortlist of clients to employers who may further decide who to interview for the role. Possible areas that could be improved would be to increase the automatic collection and processing of vacancies. In some countries, more advanced matching algorithms are used to support matching of vacancies to jobseekers (Box 4.2).

Another issue identified with vacancy matching at the SEA is the challenge users face in comprehending the classification of occupations and their associated competencies. The SEA uses the European Union's (EU's) employment, skills competences, qualifications and occupations (ESCO) taxonomy. While PES

within the EU are obliged to use the ESCO classification for the EU's European Employment Services (EURES) job vacancy platform, it has at times been difficult for employers and jobseekers to use, as they do not always know which category they should classify their skills/occupations which are listed in a high degree of detail. One approach to improve on implementation could be to use AI rather than employers and jobseekers to connect the information in job advertisements and CVs to the ESCO classification system, with for example Finland using a matching system along these lines (OECD, 2022[1]).

## Figure 4.2. The SEA provides an online portal to search for vacancies

Screenshot of Latvia's State Employment Agency's (SEA) online vacancy portal (CVVP)




Note: Text has been matching translated into English from Latvian by the web browser. "Scope" could be better translated into "industry" – examples include construction, banking, security, etc.
Source: SEA (n.d.[7]), https://cvvp.nva.gov.lv/#/pub/vakances/saraksts (accessed on 30 June 2023).

The CVVP enables jobseekers to browse vacancies, while the BURVIS portal enables counsellors to browse jobseekers. This allows counsellors to search for those jobseekers that match the employers' criteria. Matching criteria include:

- Experience required in vacancy
- Education
- Language skills
- Computer skills
- Driving license
- Driving license for heavy vehicles
- Travel distance to workplace
- Skills and competences (these are very basic – self-declared computer skills and driver's license).
- Wage
- Work type (full time, part time).

### Box 4.2. Some countries use a range of advanced digital tools to support vacancy matching

To help facilitate matching, digital tools are used in OECD countries in a variety of ways (OECD, 2021[8]). These include to:

- "**Crawl" the internet for vacancies**. Algorithms can search the internet and other vacancy databases to find vacancies that can automatically be added to the PES vacancy database. This has been done for example in the Netherlands and Austria.
- **Support employers and private employment services to automatically upload and share vacancies** with the PES. For example, Finland is working on increasing its use of application programming interfaces (APIs) to collect more vacancies from private employment services, while Sweden works with the largest advertisers to collect more vacancies (links.api.jobtechdev.se/). The Flemish PES, VDAB, has tools that allow large employers and private employment agencies to automatically upload large numbers of vacancies.
- **Predict which companies are hiring.** In a particularly innovative approach France has a tool, La Bonne Boîte (labonneboite.pole-emploi.fr), that predicts, based on past recruitment trends, which employers are likely to be hiring. Jobseekers are then encouraged to cold-call such prospective employers.
- **Perform advanced matching using AI** rather than a simple rules-based approach**.** For example, VDAB has used an algorithm that predicts what vacancies jobseekers are likely to find most interesting so as to show jobseekers search results they may find most relevant. The tool uses a very wide variety of information, including not only detailed characteristics of the skills and qualifications required but also the "click" data from job search histories of the PES database and rich demographic information to predict what similar jobseekers would find interesting. This tool is discussed in detail in OECD (2021[8]).

Key information to assess such tools is missing making it hard to determine their effectiveness. To form a good assessment of such tools one would want strong evidence on the costs and benefits. However, unfortunately information on costs is rarely public – though the range is wide and some tools can be costly. VDAB for example has a 25-person strong AI team to support its many digital tools (OECD, 2021[8]). On the benefit side one would ideally have rigorous counterfactual impact evaluations, but these too do not seem to exist or are otherwise not published.

Nevertheless, given that such tools could benefit many jobseekers and employers it is possible they allow for great improvements to PES service delivery, and the willingness of some PES to invest in these tools shows that PES believe the tools are worthwhile.

Source: OECD (2021[8]), *New ways to reach out to employers*, http://oecd.org/els/emp/Employers.pdf.

## 4.4. The SEA is looking to implement skills profiling

Digital skills profiling tools measure jobseekers' skills and can serve a wide range of purposes, from providing insights to counsellors and self-knowledge to jobseekers, to assisting with matching jobseekers to employers or to training programmes among other possible purposes (Box 4.3) Currently, SEA collects only very basic self-declared information on a small number of skills, such as computer skills and driver's licenses. At present, the SEA is seeking to develop skills profiling to better support jobseekers and counsellors, with plans to introduce skills profiling tools in a staggered approach. This has been supported by this project including through the development of a technical specification for a new digital skills profiling tool (OECD, 2023[9]).

### *4.4.1. The SEA wishes to support counsellors and jobseekers better understand jobseekers' skills*

Given the range of different purposes that skills profiling tools can serve, it is essential to clarify early in the process of designing and adopting such tool the specific purpose it will serve. The OECD, DG REFORM, the SEA and the MoW, jointly organised a workshop on skills profiling in March 2023.[2] At this workshop the MoW and the SEA tentatively agreed that the primary purpose of the tool would be to support counsellors to better and more quickly understand their clients, and to help jobseekers gain self-knowledge of their skills and interests and explore ideas for occupations they should seek (OECD, 2023[9]). By using a skills profiling tool, people can better assess their suitability for different occupations.

To allow counsellors to access the results of this test of jobseekers, the tool will need jobseekers to provide an identity to link the data to (such as the Latvian e-identity) and then an API to link data from the tool into BURVIS (OECD, 2023[9]). This would also allow the skills profiling data to be used in other data analysis exercises (such as monitoring or evaluation).

#### Box 4.3. Skills profiling tools are used in many countries to support PES

Skills profiling tools can serve a range of purposes in PES including to:

- Provide insights and self-knowledge to jobseekers.
- Support jobseekers to explore occupations and jobs that match their skills and interests.
- Match jobseekers to appropriate training which may be hosted externally.
- Support employment counsellors**:** This could be in a variety of ways including through helping employment counsellors understand their clients or by suggesting suitable occupations (job search strategies, training, or vacancies).
- Support PES management and policy makers by proving an overall picture of the skills of PES clients (i.e. information on skills supply on the labour market).
- Accredit jobseekers with a certificate so they can demonstrate their skills to potential employers (e.g. on their CVs).

Form follows function – skills profiling tool purpose should determine other design choices. Deciding which of these potential purposes the tool aims to meet is thus critical as this informs all other design choices. Such design choices include how skills are measured (e.g. self-described, a more objective knowledge-based test, or a psychological test to measure personal fit), the types of skills measured, who will take the test (e.g. whether it is public), whether data is linked to other PES systems (e.g. so counsellors can access it), and whether the test is one test or rather made up of many optional modules.

### *4.4.2. Introducing skills profiling in a staggered approach*

To support skills profiling the SEA is initially seeking to digitise two tests. One test will focus on profiling skills while the other will examine working conditions.

The “skills profiling test” will assess skills in five domains. Namely, personal, cognitive, social, technical, and management skills. For each skill area there will be 15 questions. Each question will present a statement, with individuals asked to rate how much they agree with the question on a scale of one point (strongly disagree) to five points (strongly agree). A total score for each skill category will be calculated by summing up the answers to each question, so that higher scores represent higher subjectively-rated skills.

The other test, “skills assessment in different work settings”, will work similarly but will focus on working conditions. Seven different areas will be covered, namely: physical demands, working outdoors, working indoors, working in hazardous conditions, fixed working mode (e.g. specific place, hours etc.), flexible working modes, and cognitive/intellectual demands.

Clients and counsellors will reflect jointly on the results of these tests. One feature of these tests worth noting is that they both rely on the jobseekers’ awareness, judgement and honesty when answering the questions. However, the advantage of these skills profiling tests is that both tests are easy to understand and quick to undertake with the skills test taking about 25 minutes to complete on average and the working conditions test taking around 15 minutes. At this stage the SEA has launched procurement processes only for the tests themselves, but they intend for the test to be designed in a way that API’s can transfer the information from the test into the BURVIS information system.

These two tests will utilise a modest amount of funding the SEA has available from the EU’s Recovery and Resilience Facility (RRF) in 2023 for developing skills profiling tools.

### *4.4.3. Latvia is looking to learn from other countries to further develop skills profiling tools*

While the two tests described above can be designed and deployed quickly, Latvia is also working on developing more sophisticated skills profiling that will take longer to develop. To do this, Latvia is keenly interested in learning from and building on the experiences of other countries. At the March 2023 workshop, the SEA and MoW learned about skills profiling practices and developments in several other countries Latvia is hoping to leverage the learnings of other countries further potentially building on the digital infrastructure and assessment procedures (questions and scoring) of other countries’ platforms. For example, the SEA and MoW have been actively engaging with the French public company Pix which develops digital skills profiling and, in an excellent example of international co-operation, Latvia is also working with the German PES to see if it is possible to leverage not only the questionnaires, but the code and digital infrastructure of Germany’s skills profiling tool. The aim is to see if this infrastructure can be modified so as to also serve the needs and purpose of Latvia. Such co-operation would help avoid duplication of effort across European countries and potentially save Latvia much time and effort. This co-operation relies on the efforts of other countries to share resources such as their code and questions.

Turning to synergies within Latvia, there are strong links between the needs of skills profiling at the SEA and those of the Ministry of Education, with the Ministry of Education interested in understanding the skills of the entire adult population (not only jobseekers which is the priority of the SEA). To provide complimentary approaches and synergies and avoid any unnecessary duplication, the SEA, the MoW and the Ministry of Education and Science will need to maintain close dialogue with each other.

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# Annex 4.A. Latvia's responses to the OECD AI survey

## Annex Table 4.A.1. The SEA responses to the OECD questionnaire on digitalisation in PES

| Online solutions for jobseekers, people at risk of job loss, citizens | Online solutions for employers and service providers | User interfaces for PES staff |
|---|---|---|
| | **Functions the SEA has** | |
| Apply for registration / register with the PES | Register (post) a vacancy | Identify potential clients proactively to support outreach – including inactive people, people leaving the prison system, etc. |
| Create CVs and job application documents | Advertise vacancies | Profile jobseekers |
| Provide information for PES on skills, education etc. | Find suitable employees | Map jobseeker's distance to occupations and gaps in competencies |
| Test skills | Receive information and counselling, including via chatbots and conversation bots | Recommender systems in career services based on analysing expected skills by employers and previous career choices of workers |
| Analyse suitable career paths based on jobseeker's interests | Share information with PES (on hired jobseekers, filled vacancies) | Develop and manage individual action plans |
| Report job-search activities | Apply for measures for employers (employment incentives, staff training etc.) | Monitor clients' job search activities |
| Receive info on available services and measures and their eligibility conditions, including via chatbots | Share information on using PES measures (wage data for employment incentives etc.) | Monitor clients' participation in services and measures |
| Find suitable training options | Share participant data (jobseeker data, contacts) | Match jobseekers to vacancies |
| Participate in virtual training | Share data on jobseeker participation (no-shows, drop-outs) | Process jobseeker applications for registration |
| Apply for services and measures (including training) | | Process unemployment benefits, unemployment assistance and other benefits |
| Apply for unemployment benefits, unemployment assistance or other income support benefits | | Identify entitlement for unemployment benefits, unemployment benefits and other benefits (proactively) |
| Choose a provider (training provider, private provider of employment services) | | Monitor activities of contracted service providers |
| Provide feedback on services and measures (satisfaction) | | Share information on suitable candidates with employers |
| Find suitable vacancies | | |
| Apply for suitable vacancies | | |
| | **Functions the SEA does not have** | |
| Map jobseeker's distance to occupations and gaps in competencies | Identify vacancies proactively – companies with high recruitment likelihood | Target ALMPs – receive recommendations for the type of support to provide to different profiles of PES clients |
| Recommender systems in career services based on analysing expected skills by employers and previous career choices of workers | Share performance monitoring data | Refer clients to ALMPs |
| | Apply to become a co-operation partner / receive accreditation, certification | Process applications for services and measures by jobseekers |
| | | Process applications by employers, service providers |
| | | Identify vacancies proactively regarding companies with high recruitment likelihood |
| | | Pool vacancies from other portals (web crawl) |

Note: PES – public employment service. This table shows the functions that the IT infrastructure in in the Latvian PES (State Employment Agency) supports. Functionalities related to unemployment benefits are not shown as these are not managed by the PES in Latvia.
Source: OECD questionnaire on digitalisation in Public Employment Services to support the provision of active labour market policies launched in March 2023.

# Annex 4.B. The SEA's profiling tool

## Annex Figure 4.B.1. The SEA's profiling tool spreadsheet

KRG_4.2.5_28.appendix_3.version 21.07.2022.

**Profiling questionnaire**

| Evaluative criteria | Evaluation of customer data | Risk factors | Risk factor value |
|---|---|---|---|
| Age | | The unemployed person is younger than 18 years or older than 50 years | 1 |
| Disability | | The unemployed person has a disability or a foreseeable disability | 1 |
| place of residence | | The unemployed person has insufficient mobility to get to the workplace | 1 |
| Knowledge of the national language | | An unemployed person's national language skills do not meet the required level to work in the professions in which they are looking for work; | 1 |
| Education | | The unemployed person has only general secondary or basic education;<br>The unemployed person has professional education that has lost its relevance, because he has not been employed in accordance with his education in the last five years | 1 |
| Last occupation (including if the last occupation is work) (the risk factor is assessed with the value "2") | | Unemployed person before registration in NVA:<br>· has been on parental leave;<br>· was in a prison;<br>· has not worked for a paid job;<br>· has not worked for a paid job in the last five years | 2 |
| Professions in which you are looking for work | | There are no registered vacancies in the occupations you are looking for. | 1 |
| Other factors that significantly hinder the initiation of employment legal relations (the risk factor is assessed with the value "2") | | Addictions<br>Takes care of a small child who has not yet reached the age to attend a pre-school educational institution;<br>Caring for a person with a disability | 2 |
| Basic digital skills | | The unemployed person's basic digital skills (sending an e-mail, preparing a CV, using e-services) are insufficient to find and/or perform work in the occupations in which they are looking for work | 1 |
| The unemployed person's motivation to look for a job | | Ask a question: please rate on a 1-5 point scale, how important is it for you to find a job in the next 3 months? (Low motivation is when the number of points is 1-3.)<br>Not important / 1 / 2 / 3 / 4 / 5 / Very important | 1 |
| In total | 0 | | |

| Opportunities to find work | Group 1 (A) | 2nd group (V) | 3rd group (Z) |
|---|---|---|---|
| **Profiling group** | | | |

| | |
|---|---|
| Notes (*indicates the rationale for the marked profiling group if the employee's decision is to downgrade the profiling group* ): | |

| Evaluation of unemployment data compared to risk factors, or the number of risk factors of unemployment | Assessment of job opportunities |
|---|---|
| 0 - 2 | Group 1 Unemployed with high chances of finding a job (A) |
| 3 – 6 | Group 2 Unemployed with average job-finding opportunities (V) |
| 7 – 12 | Group 3 Unemployed with low chances of finding a job (Z) |

Note: This form has been machine translated from Latvian into English.
Source: Latvia's State Employment Agency (SEA).

## Notes

[1] This requirement, while increasing the number of vacancies posted with SEA, in fact can make it more difficult to gauge the true number of job openings in practice. Employers may artificially inflate the number of job vacancies posted in order to ensure that a sufficient number of vacancies remain unfilled from the local workforce, ensuring that they are able to get a permit to employ third-country nationals.

[2] Agenda and presentations available at: www.oecd.org/els/emp/Digital_tools_workshop07032023_Agenda_and_concept%20note.pdf.

# 5 The role of ALMPs in reaching people in need of support and addressing their needs

The State Employment Agency (SEA), the public employment service of Latvia, plays a crucial role in using active labour market policies (ALMPs) to connect people with jobs. This includes meeting the needs of jobseekers, as well as persons at risk of employment. This chapter assesses how the SEA's services and measures reach people in need of ALMPs and provide them with appropriate support. The chapter does this by analysing rich administrative microdata including detailed information on ALMP participation, unemployment histories, social insurance receipt, and earnings histories.

## 5.1. Introduction

This chapter uses administrative data to assess how well targeted the Latvian State Employment Agency's (SEA) services and measures are to different jobseekers. The chapter uses detailed administrative data to diagnose the different obstacles that individuals might face to labour market integration and then analyses whether the services and measures provided help address the specific barriers and are targeted towards individuals according to their needs.

The SEA uses a profiling tool to group jobseekers into different categories of risk based on their perceived likelihood of finding employment. These groups are determined via a count of the number of specific risk factors an individual has. This tool is used to support the SEA counsellors to provide appropriate guidance to their clients and to make effective ALMP referral decisions. The chapter analyses whether the different groups of individuals that are defined by the profiling tool are associated with participation in the different ALMPs designated for these groups. It then looks at how the different profiling tool groups are associated with specific barriers to employment identified in the chapter.

This chapter stands as a natural complement to the prior chapters, which assessed how well the overall IT infrastructure and the jobseeker profiling, job matching and other digital tools available to the SEA counsellors, support them to help jobseekers, people at risk of job loss and employers.

The analysis relies on datasets of registered unemployed people and jobseekers not in registered unemployment, their background characteristics and their interactions with the SEA. The data come from two sources, the register data held by the SEA for its clients, and information on earnings and receipt of social insurance benefits provided by the Latvian State Social Insurance agency (SSIA).

Section 5.2 presents the data that are used in the analysis. Details are provided on the type of ALMPs that are undertaken by jobseekers and on what the different programmes comprise. To aid exposition, ALMPs are categorised into broad support types, using the methodology utilised by the OECD and the European Commission when reporting on ALMPs (OECD, 2022[1]). In Section 5.3, data are analysed to determine how attached different jobseekers are to the labour market, to identify those that may be in greater need of support from ALMPs. A number of different obstacles of employment are identified, to determine the precise needs of individuals with weaker labour market attachment. In Section, 5.4, the SEA's jobseeker profiling tool is assessed against both its pre-determined ALMP selection for employability categories and against how these employability groups enter into ALMPs addressing specific needs. Finally, in Section 5.5 a quantitative assessment is conducted on the specific labour market obstacles identified, to understand the match between participation in ALMPs and barriers to employment.

## 5.2. Administrative data on ALMPs

The following sections outline the data that are used in the chapter and then provide some summary statistics to set the scene for the more detailed quantitative analysis conducted later in the chapter.

### *5.2.1. Detailed administrative microdata form the bedrock for analysis*

The chapter makes use of individual level administrative data provided by two government agencies, SEA and the SSIA. The use of linked administrative data for policy analysis in Latvia is well-established (see for example (OECD, 2019[2]; 2015[3]), enabling Latvia to benefit from the evidence-building and the rich policy insights that such data linked analysis permits (OECD, 2020[4]). The continued use of their administrative data for policy analysis allows Latvia to progressively build evidence on its policies, so that they can refine and improve them to better service citizens.

The data in this chapter are linked using anonymised individual-level keys based on an individual's personal code. In this manner it is possible to link individuals between different datasets within the SEA administrative data and between the SEA and the SSIA data. This latter linking allows the chapter to utilise information on individuals' past trajectories in the labour market, to help provide more insight on determining needs of participants. The data are provided for all individuals that were registered with the SEA between 2017 and 2022 (all new and existing registrations between these dates). In addition to this, data stretch back into the past to allow the chapter to analyse how previous labour market histories impact upon the likelihood of starting an ALMP. SSIA data go back to 2015, whilst the chapter has information on the SEA unemployment registrations back to 2012.

Detailed individual-level data allow the analysis to thoroughly disaggregate individuals by their personal characteristics (Table 5.1). Data from the SEA provide information on unemployment histories, education, nationality, age, gender, disability, return from parental leave, self-reported language and IT skills, and whether individuals have previously been incarcerated. SSIA data provide information on receipt of various different social insurance benefits and on monthly earnings of all the SEA clients in the sample.

**Table 5.1. Individual-level administrative data from the SEA and SSIA are used in the chapter**

| Provider | Dataset | Variables | Periodicity | Data timeline | Sample |
|---|---|---|---|---|---|
| SEA | Unemployment spells data | Start date of registration, end date of registration, gender, month and year of birth, profiling information, nationality, the SEA office, education level and field, disability status, previous occupation, | Spells | 2017-22 | All individuals registered with the SEA between 2017 and 2022 |
| | ALMPs | programme name, programme description, referral date, start date, end date | Spells | 2017-22 | |
| | Previous Unemployment | Start date, end date | Spells | 2012-17 | |
| | Vacancy data | Employer, the SEA office, date of registration, individual ID | Per vacancy | 2015-22 | |
| | IT skills | Low/medium/high competence rating, software name | Per software programme | Undated | |
| | Language skills | Language, reading/writing, level | Per individual | Undated | |
| SSIA | People | Gender, month and year of birth | Per individual | Undated | |
| | Earnings | Amount of earnings, amount of social contribution amounts, month | Monthly | 2015-22 | |
| | Benefit Payments | Unemployment benefit, disability benefits, family allowance, Sickness benefit, downtime assistance benefits | Monthly | 2015-22 | |

Note: ALMPs: Active labour market policies.
Source: OECD summary of Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) data utilised in the chapter.

### *5.2.2. ALMP participation has fallen over time*

Data on the number of individuals starting ALMPs by month show a gradual decrease over time, both in absolute terms and as a proportion of all registered unemployed (Figure 5.1). Across the observation window in this chapter there are three relatively distinct periods of varying participation levels.

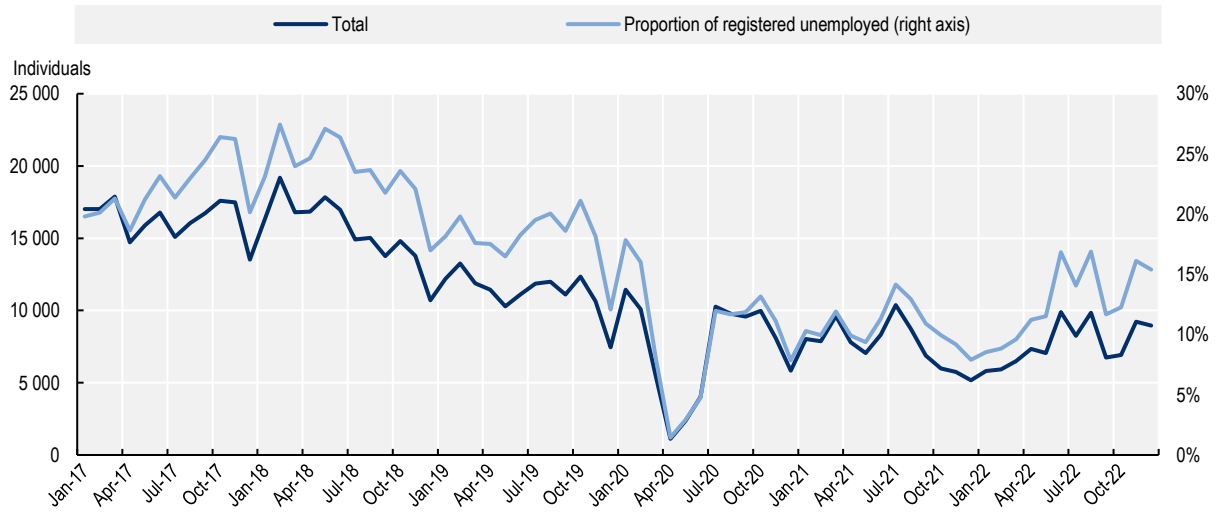
- Relatively high participation marked the period from the start of 2017 until June 2018, where there was on average 16 700 individuals (or 23% of all registered unemployed) starting ALMPs every month. This period also benefited from relatively high participation from ESF-funded projects as part of the 2014-20 programme of works.
- In the period from July 2018 to February 2020, participation began to fall and only an average of 12 000 individuals started an ALMP each month (19% of registered unemployed).

- In the post-COVID-19 period, removing the months whereby confinement stopped participation in many programmes, fewer individuals participated in ALMPs. From July 2020 to December 2022, on average 7 900 individuals started an ALMP each month, or 11.6% of registered unemployed.

In this context, where participation has decreased over time, targeting ALMPs towards those that need them most can ensure that scarce resources are deployed most effectively. Increasing the funding for ALMPs, to reverse the recent decline in participation, is also important to ensure that as many individuals as possible can benefit from ALMP support (including those with both high and low predicted employability and to ensure jobseekers are equipped to combat the megatrends such as digitalisation, AI and the green transition).

### Figure 5.1. ALMP participation has reduced over time in absolute and relative terms

Number of individuals participating in active labour market policies (ALMPs) by month




Note: Data here represent individuals and not ALMPs, so that an individual with more than one recorded ALMP in a month is recorded only once.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) administrative data.

StatLink https://stat.link/4w6bcy

### *5.2.3. Labour market services and training are most undertaken in the basket of ALMPs offered to jobseekers*

Labour market services offered by the SEA are the most frequent ALMPs offered to jobseekers (Table 5.2). The data comprise just over a million ALMP participations in total (between 2017 and 2022) and, of these, labour market services account for around 70% of the total participations. This is a usual feature of public employment services, as these are short interventions offered to jobseekers (often several times) in order to better orientate themselves in their job search, with career guidance and advice on job applications. The mean duration for all interventions in the services category is less than one day (0.2 of a day).

Training is also common for the SEA clients and covers a range of different courses, designed to provide upskilling and reskilling to participants. Training programmes include various additional vocational development programmes and modular training courses with a relative focus on IT learning. These cover a range of topics, including computer science (15% of all courses), language courses and driving qualifications. Other IT courses are also offered (for example, on computer-aided design (CAD), web development and digital marketing). Vocational training comprises around one-third of all training and

include a large range of professionally orientated training. The largest five vocational courses are for small business organisation (11%), project management (10%), arc welding (8%), customer service operator (7%) and clerk (7%). So, it is evident to see that the range of training is diverse, can cover many different topics and therefore can potentially help individuals to find employment across many different sectors and jobs. It can change with labour market demands as well, for example such that recent demands for carer, cooks and pastry assistants, can be catered for with well-tailored short vocational courses.

### Table 5.2. A wide range of ALMPs are offered to jobseekers

Active labour market policies (ALMPs) sorted by frequency (in terms of participations) from largest to smallest

| Programme Name | ALMP Category | Frequency (number of participations) | Duration (days) |
|---|---|---|---|
| Career counselling | Services | 450 200 | 0 |
| Competitiveness measures | Services | 165 500 | 1 |
| Support measures for the long-term unemployed | Services | 141 500 | 2 |
| Access to non-formal education | Training | 71 900 | 43 |
| Temporary paid public works (temporary works) | Job Creation | 66 000 | 79 |
| Education support – E-learning | Training | 53 100 | 91 |
| Summer employment for school pupils | Employment Incentives | 39 800 | 28 |
| Vocational training programmes | Training | 20 500 | 83 |
| Support for regional mobility: financial reimbursement of transport costs | Employment Incentives | 18 600 | 50 |
| Measures to start a business or self-employment | Start-up Incentives | 10 600 | 35 |
| Measure for certain groups of persons | Employment Incentives | 7 500 | 311 |
| Distance learning Pilot project | Training | 3 900 | 62 |
| Subsidised jobs – individual support measures | Training | 3 400 | 0 |
| Education support – Video lectures | Training | 3 100 | 77 |
| Occupational therapist service | Services | 2 900 | 0 |
| Promotion of regional mobility of persons employed by businesses | Employment Incentives | 2 300 | 111 |
| Practical training | Training | 2 200 | 133 |
| Subsidised jobs – development of skills for employment | Job Creation | 1 800 | 178 |
| Distance learning on Google applications | Training | 1 800 | 66 |
| Youth Guarantee- development of skills for employment in the non-governmental sector | Job Creation | 1 600 | 117 |
| Subsidised jobs – support measures | Services | 1 500 | 22 |
| Training on online course platforms | Training | 1 400 | 47 |
| Minnesota | Sheltered Employment | 1 100 | 27 |
| European co-operation network of employment services | Services | 900 | 0 |
| Developing skills for work in the non-governmental sector | Job Creation | 800 | 126 |
| Youth Guarantee- workshops for young people | Training | 700 | 36 |
| Youth Guarantee – first work experience for young people | Employment Incentives | 200 | 194 |
| Support for regional mobility: financial reimbursement of rental costs | Employment Incentives | 100 | 65 |
| Support for the assessment of professional competence | Training | < 100 | 0 |

Note: Duration represents mean duration of ALMP in days. Measures with start and end dates on the same day will appear as 0.
Source: OECD analysis of Latvia's State Employment Agency (SEA) data.

StatLink https://stat.link/ojyita

Outside of labour market services and training, direct job creation schemes and employment incentives are also relatively frequent, covering around 15% of total ALMP participations. Start-up incentives and sheltered employment are very infrequent and comprise only of one programme in each of these two categories.

The data show that the ALMPs offered to clients by the SEA are varied and can potentially cater to many different needs and barriers. The chapter will now proceed to analyse how well these different ALMPs are provided to individuals when mapped against their individual needs.

## 5.3. Establishing groups in need of active labour market policies

This section uses administrative data to identify groups that would be likely to benefit from ALMPs. It follows previous OECD work (OECD, 2021[5]) which categorises individuals based on their previous labour market attachment and the different types of potential barriers they might have to entering the labour market.

One major difference between the previous work and the work in this chapter is that here the focus is only on the registered unemployed, because no data are available on the wider group of non-registered unemployed and inactive individuals. This limits the ability of the chapter to provide information on this wider group of individuals.

To determine which individuals may need further assistance to help them engage in the labour market, administrative data are used to determine the extent of an individual's labour market engagement in the 12 months prior to becoming unemployed. Labour market weakness is identified by grouping three types of individuals:

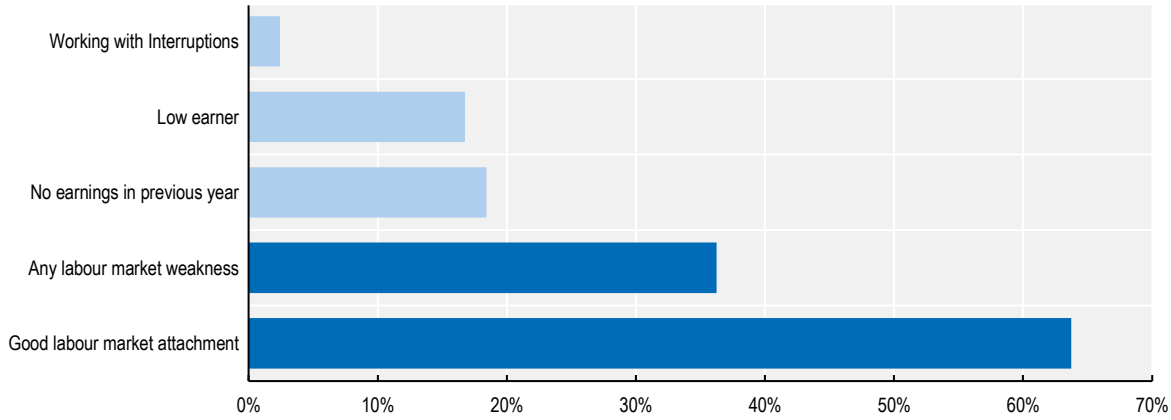
- No earners – those with no earnings in the previous year;
- Low earners – those earning less than 50% of the median earnings of all individuals for that year;
- Working with interruptions – those with positive earnings in the year, but with at least three months of unemployment.

By contrast, individuals who do not share these features are defined as having good prior labour market attachment. Reviewing both individuals with good and weak labour market attachment in the year prior to unemployment allows the analysis to determine whether groups with worse labour market attachment also face more obstacles to labour market integration. Identifying the precise nature of these barriers then allows to determine whether individuals are receiving the support they need from ALMPs.

### *5.3.1. Around a third of the Latvian registered unemployed could benefit from ALMPs*

Around one-third of registered jobseekers have a weak attachment to the labour market and could benefit from ALMPs to help connect them to jobs (Figure 5.1). Just under 20% of individuals had no earnings in the 12 months prior to registered unemployment and a slightly smaller proportion of individuals had low earnings. A smaller proportion (around 5%) worked but with interruptions in the year.

**Figure 5.2. Around one-third of registered unemployed people had weak labour market attachment prior to becoming unemployed**




Note: Any labour market weakness represents the presence of any of the three individual light blue characteristics for an individual.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative microdata.

StatLink https://stat.link/2g3y59

### *5.3.2. Labour market obstacles are defined based on the type of challenge they present*

The analysis groups different supply-side obstacles to the labour market using a similar methodology to previous OECD work on this topic (2021[5]) into broad thematic areas based around skills and qualifications, geographic challenges, family-related obstacles, health-related obstacles, integration challenges and motivational challenges. The groupings in this chapter are based around these same broad areas, but the precise indicators included in each group are slightly different and based on the availability of the administrative data available.

- Skills and qualifications – this grouping looks at people's capabilities, recognising that low skills may limit the extent to which people can work in high-paying jobs. Having fewer skills can also lead to fewer job opportunities in the labour market, as it becomes more difficult to satisfy requirements for job applications. This challenge is captured via three variables: 1) poor qualifications, defined as ISCED 2011 categories 0-2; 2) no professional education, defined as no vocational or higher education degree; 3) not having Latvian reading and writing skills; 4) Not having any IT skills recorded with the SEA. The drawback of the current measures on language and IT skills is that they are self-assessed and therefore subjective and prone to individual error. The SEA is currently exploring how it might capture this information using more objective measures.
- Geographic challenges – is measured by whether an individual lives in an area where job opportunities are particularly scarce. This is defined using two variables. The first looks at the SEA branches with the highest share of jobseekers with weak attachment to the labour market (so that the top 10% of branches are identified). The second looks at whether the number of registered vacancies per registered unemployed person in the local branches of the SEA is in the bottom top 10% of branches.
- Family-related obstacles – look at whether a person is available to take on job search and employment. Care obligations may limit the number of hours a person is available for work. This is measured by two variables. One which captures those individuals that have recently returned from a period of parental leave and looks at receipt of family-related benefits in the previous year. A second variable looks at whether individuals have care responsibilities for a child or an adult with disabilities in the previous year. The drawback of these data is that they will not show caring

relationships where the carer is not a direct relative of the carer, so may understate the number of potential carers in the data.

- Health challenges – receipt of disability benefits (having Latvian disability status) is used to indicate whether an individual has a health condition. Having a health condition may make it more difficult for individuals to undertake certain jobs and may limit the amount of work someone might be able to do. This will present further challenges to labour market integration relative to someone in good health. Disability in this context is defined as long-term or permanent limitation of functioning which affects the mental or physical capacity, capacity, self-care and integration of a person. The limitation of this definition of disability is that it is not possible to determine how much this affects the ability of an individual to work, meaning for some individuals it could over-state the impact on their labour-supply, whilst for other individuals it could understate it. Similarly, it will not capture other individuals with health challenges which may impact work, but who do not have Latvian disability status.
- Integration challenges – circumstances which may mean that individuals have additional challenges integrating into society and may contribute to further difficulties with labour market integration: 1) Long periods without work, defined as three consecutive years without any earnings from employment and without registered unemployment; 2) Individuals without Latvian nationality, who may have additional problems integrating into society (either due to language or other networking and integration challenges); 3) Individuals who have been released from prison.

Alongside categorising individual needs by these broad categories, the chapter also groups ALMPs by whether they are general in nature (for example, general job-search support given by counsellors), or whether they cater to needs specific to the groups of obstacles outlined above (for example, financial support for re-location which helps individuals with geographic obstacles). By doing this, the chapter can consider how well targeted ALMPs are to individuals' needs.

### *5.3.3. People with weak labour market attachment often face several obstacles to labour market integration*

People with several obstacles to employment and weak labour market attachment will have an increased need for ALMPs to help them overcome difficulties finding employment and high-quality jobs. Table 5.3 displays the correlation between weak labour market attachment and different obstacles to employment, as defined in the previous sections. It also shows how frequently individuals face more than one different type of barrier to employment. Alongside those individuals with weaker labour market attachment, statistics are presented for those with good labour market attachment, so that the relative incidence of obstacles in each group can be contrasted between those with better and worse previous labour market attachment.

**Table 5.3. People further from the labour market face greater obstacles to employment**

| | Good labour market attachment | Weak labour market attachment | …no earnings | …worked with interruptions | …low earner |
|---|---|---|---|---|---|
| **Skills barrier** | 90% | 95% | 95% | 95% | 95% |
| Low qualifications | 16% | 29% | 32% | 29% | 26% |
| No professional qualifications | 66% | 78% | 77% | 80% | 79% |
| No IT skills | 71% | 76% | 77% | 74% | 75% |
| No Latvian reading or writing skills | 22% | 29% | 31% | 23% | 27% |
| **Geographical barrier** | 11% | 18% | 18% | 25% | 16% |
| Area of lots of weak LM attachment | 5% | 12% | 13% | 20% | 11% |
| Area with few vacancies | 7% | 7% | 7% | 5% | 7% |

| | Good labour market attachment | Weak labour market attachment | …no earnings | …worked with interruptions | …low earner |
|---|---|---|---|---|---|
| **Family-related barrier** | 21% | 33% | 37% | 23% | 31% |
| Receipt of Family benefits | 21% | 33% | 36% | 23% | 31% |
| Receipt of Carer benefit | 0% | 1% | 1% | 1% | 0% |
| **Health barrier** | 4% | 11% | 10% | 19% | 11% |
| **Integration barrier** | 36% | 54% | 65% | 42% | 43% |
| Ex-prisoner | 0% | 1% | 1% | 0% | 0% |
| Not Latvian | 36% | 44% | 45% | 42% | 43% |
| 3 years of inactivity | 0% | 31% | 61% | 0% | 0% |
| **Groups of barriers, those with at least:** | | | | | |
| 1 | 95% | 99% | 100% | 98% | 99% |
| 2 | 53% | 79% | 79% | 71% | 71% |
| 3+ | 12% | 29% | 29% | 29% | 24% |
| **Individuals in group** | 214 752 | 122 150 | 62 061 | 8 170 | 56 464 |

Note: Percentages are defined as the proportion of individuals in each group (e.g. good labour market attachment) that have each of the attributes in the rows. The attribute categories (e.g. Integration barrier) displays the proportion of individuals with at least one of any of the underlying attributes in that category.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative microdata.

StatLink https://stat.link/enbw9h

Almost all unemployed people have some kind of barrier to employment, but multiple barriers are more common for those with weak labour market attachment. For those with weak labour market attachment, almost one-third (29%) face three or more different types of obstacles to employment, whilst four-fifths (79%) face at least two different obstacles. For those with good labour market attachment, multiple obstacles are still common, but are less prevalent. Only 12% of the group with good labour market attachment have three or more different barriers and only half (54%) have two or more.

### *5.3.4. Skills obstacles are common across groups with weak and good labour market attachment but more acute for those with weak attachment*

Table 5.3 also demonstrates that ALMPs that promote upskilling are important in the Latvian context. Despite some differences between those with good and weak labour market attachment, skills obstacles are common across all groups. Ninety percent of those with good labour market attachment face some kind of skill barrier, whilst this figure rises to 95% for the group with weak labour market attachment.

A lack of high levels of education is common across all groups, but is worse for the groups with weaker labour attachment. Around one-third (34%) of individuals with good labour market attachment have professional level qualifications, whilst only one in five (22%) of those with weak labour market do. Individuals with weak labour market attachment are around twice as likely to have low levels of education (29%) as those with good labour market (16%).

When looking at softer skills, around three-quarters (76%) of individuals with weak past labour market attachment do not report the presence of any IT skills with the SEA. This is an imprecise measure, because it relies on individuals reporting their different IT skills to the SEA, but it hints at a possible need to ensure upskilling of individuals to participate in upskilling programmes that can build these skills to enable participation in the modern, digital economy. Here too these obstacles are more acute for those with weak labour market attachment, relative to their peers who are well attached to the labour market (only 71% without IT skills recorded with the SEA). Better recording of the specific skills that jobseekers possess by

counsellors and how these relate to vacancies in desired occupations would facilitate more nuanced and complete discussions in counselling sessions.

Finally, almost one-third (29%) of individuals do not report presence of Latvian reading or writing skills, above an elementary level (A2 in the European Framework of Reference for Languages). Not having the requisite language skills in Latvian will present a significant obstacle to employment and training and will preclude any job that involves use of the Latvian language to communicate, limiting the opportunity for access to good-quality jobs with significant progression opportunities.

### *5.3.5. Geographical barriers are more prevalent for those with weak labour market attachment*

Living in an area with limited employment opportunities is another obstacle faced by people with potential ALMP needs. Those with weak labour market attachment are almost two-thirds more likely than those with good labour market attachment to seek work at a branch of the SEA which is associated with high levels of labour market detachment or where there are few vacancies per jobseeker. This means that for individuals searching for work in these areas, employment opportunities may be harder to come by and there may be greater needs to travel for work. ALMPs that seek to surmount these issues, such as those that help with travel and relocation costs, or that look for ways to broaden job search, can help individuals to alleviate obstacles which are dependent on their geographical location.

### *5.3.6. Family and caring responsibilities are particularly prevalent for those who have no earnings in the previous year*

One-third of individuals with potential ALMP needs have family commitments that might impinge upon their ability to look for employment in labour market. Having family needs may limit both the number of hours of work sought, and the type of jobs that individuals are able to apply for to accommodate their schedules of family care. Similarly for those individuals that are returning to the labour market after a period of absence, due to family-related care obligations, more support may be necessary to ensure that individuals are able to fully engage with the labour market opportunities that are present. Of the group that had not worked in the past year, 36% had some kind of family-related obstacle to employment. Ensuring ALMPs that are cognisant of these issues and find ways to nurture and encourage individuals to overcome these obstacles are important in this context. This must be done in across institutions as well, to ensure that separate social services are joined-up and reinforce one another.

### *5.3.7. Health conditions are associated with higher obstacles to employment, particularly so for those with some earnings and unemployment in the previous year*

Bad health, which limits the ability of an individual to search for and take-up work is much more commonly associated with those with weaker past labour market attachment. One in ten (11%) individuals in this group are recorded as having some kind of severe health problem, and the individuals with weak labour market attachment are over three times as likely to have a disability as the group with good labour market attachment (4%). This proportion is highest for those who previously worked with interruptions (19%), highlighting the need for ALMPs which can unlock the labour market potential of individuals and facilitate individuals to engage with work that can be flexible to accommodate diverse health needs.

### Box 5.1. Health and family-related obstacles also prohibit individuals from searching for work

Using the European Union Labour Force Survey, it is possible to study those individuals of working-age not currently in the labour force due to not looking for work. This can provide insight on what policies may help to bring individuals back into the labour market, and provide clues as to their barriers to accessing the labour market. It complements the analysis of the registered unemployed population, which can only provide insight on those currently looking for work.

In 2020, 22% of the Latvia working-age population (aged 15-64) were inactive. This compares favourably to the OECD average of 29%. In Latvia, of the group that are inactive, 18% say they would like a job (4% of the total working-age population). This is lower than other EU countries, for whom 21% would like a job (around 6% of the working-age population).

**Prime-aged and older individuals are mainly restrained by family-related and health obstacles**

The proportion of prime-aged individuals (those aged between 30-54) who are inactive but would like to get a job is 40%. Illness and family or caring responsibilities are a large determinant of this group not actively seeking work. Twenty-seven percent do not seek employment due to illness and a further 34% do not work because of caring (17%) or other family responsibilities (17%).

For older individuals (aged 55-64) bad health plays an even greater role for the inactive, with 37% of individuals reporting this as a reason for not seeking employment.

**For the young, inactivity is largely due to studying**

For those aged 15-29, the overwhelming reason for not seeking work is due to being in education or training (83% of individuals), although 8% report family and caring responsibilities as the reason.

**Policy making should alleviate barriers to help individuals re-enter the labour market**

Policies to alleviate family-related and health obstacles to employment could help to activate some currently inactive individuals. For example, further help with childcare or caring costs may help individuals to combine some element of caring with labour market participation. The domain of these policies is not likely to sit entirely within the Ministry of Welfare or the SEA. Here the SEA can have an important role to co-ordinate with the relevant social services providing this support. It is also important for the SEA to be aware of these obstacles more generally, because if individuals are successfully brought into the labour market, it is likely that many of these barriers would still exist in some form or other, meaning that having ALMPs to further support them would be important to help continue their journey back to the labour market.

Source: OECD calculations based on the European Union Labour Force Survey (EU-LFS) data.

## 5.4. Latvia has a jobseeker profiling tool that guides targeting of ALMPs

The SEA introduced a new profiling tool in 2019, to separate jobseekers into three groups depending on their job readiness and their perceived likelihood of finding employment. This tool replaced an existing tool that was overly complicated and seen not to be serving the needs of counsellors and jobseekers. More detail outlining of the current and previous profiling tools can be found in Chapter 4. The 2019 "rules-based" tool relies on counsellors collecting information on risk factors at an interview with the jobseeker. These factors are then counted to divide jobseekers into three groups, dependent on the number of risk factors an individual has.

Fifteen different risk factors are gathered by counsellors at the interview to categorise jobseekers into the three different groups. The factors cover attributes like age, disability, language, mobility for work, education, parental responsibility, work experience and skills. Some risk factors are counted with a factor of 2, to give them more weight in the grouping calculation. Those in the group with the highest chances of finding employment are expected to do so within 6 months, the medium risk group in between 6 and 12 months, and the lowest in over 12 months.

Based on an individuals' risk group, the profiling tool should direct counsellors to refer individuals to different types of ALMPs:

- ALMPs for all risk groups;
- ALMPs for those with medium and low employability;
- ALMPs for those in the low employability group.

These risk groups only provide recommendations for the type of ALMPs that individuals go into and counsellors have the discretion to deviate from recommendations where they feel it necessary.

ALMPs deemed suitable for all risk groups cover general career advice and guidance, more general and basic training (for example obtaining a driving license), support for regional mobility and support for setting up a business. ALMPs which are suitable only for those with medium and low risk introduce further professional training and skills development ALMPs. Those ALMPs reserved for the low employability group include public works programmes, ALMPs that cover motivation and social mentoring for the long-term unemployed with disabilities, counselling with a psychologist and subsidised employment programmes.

### *5.4.1. The tool is associated with good profiling across some dimensions but improvements could also be made in others*

The profiling tool has a good association with the likelihood of individuals participating in ALMPs categorised for those with employability challenges. For ALMPs designed for those with low employability, there is a much higher likelihood of individuals from this group participating in them. Individuals in the low employability group are almost five times as likely as those from the high employability group to participate in this type of ALMPs (Table 5.4). They are also around 2.5 times more likely to participate in this kind of ALMPs than those from the medium employability group.

In addition to low employability individuals participating in ALMPs intended for the low employability group, fewer individuals from the good employability group participate in ALMPs for the low employability group, relative to those from the medium employability group. So there is a logically consistent relative participation likelihood of each of the groups. The low employability group have the highest likelihood of participating in ALMPs for the low employability group, followed by those with medium employability, followed by those with high employability.

### Table 5.4. ALMPs targeting risk employability groups are not always more likely to have those individuals participating in them

Relative probability of entry into ALMPs targeting different employability groups

| | ALMPs intended for | | |
|---|---|---|---|
| | All groups | Medium + Low Employability group | Low Employability group |
| **Compared to High Employability groups:** | | | |
| Medium Employability | 1.2102** | 0.7363* | 2.1207*** |
| Low Employability | 1.155 | 0.3596*** | 5.4930*** |

Note: Odds ratios reported, where any value greater than one implies higher probability and any value less than one lower probability. For example, 1.2 would indicate a 20% greater chance, 0.8 would indicate a 20% smaller chance. Results based on a logistic regression of ALMP entry types using risk profiling groups as explanatory variables Stars denote statistical significance- * significant at 5%, ** significant at 1%, ***significant at 0.1%. Individual employability groups and ALMP types as designated by the SEA profiling tool.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative data.

StatLink https://stat.link/vq6nwy

*Individuals with high employability are more likely to participate in ALMPs designated for those with medium or low employability*

High-employability people are more likely to participate in ALMPs that are meant to reach more those with medium and low employability, according to the client profiling. Those individuals from the medium employability risk group are 26% less likely than those with high employability to participate in ALMPs designated for those with medium or low employability. Those from the low employability group are almost two-thirds less likely to participate (64%) than those with high employability. More efforts to ensure that participation from these two lower employability groups are needed, to redress the imbalance that results in more individuals from the high employability group undertaking these ALMPs. For example, counsellors can invest more time in explaining the benefits of these ALMPs to individuals in the low and medium employability groups to encourage participation from them. Similarly, ensuring there is sufficient ALMP provision for those designated with high employability, such as shorter specific programmes focused on skills gaps, may help to reduce demand for ALMPs intended for individuals with greater difficulties finding work.

*For ALMPs suitable for all types of individuals, the profiling tool is associated with higher participation from individuals with more employment challenges*

Participation in ALMPs that are suitable for all individuals, is slightly more weighted towards those individuals with more risks to finding employment. Whilst the profiling tool guidance designates that these ALMPs are available for all types of individuals, the fact that those with more challenges to finding employment are associated with increased participation means that more support is being given to individuals that have may have potentially more difficulty in securing employment. Both the medium and low employability groups are around 20% more likely to participate in this set of ALMPs, relative to those with good employment prospects (although some caution should be attributed to the estimate for the low employability group, as the result is not statistically significant).

*The profiling tool could better distinguish some ALMP needs among low and medium employability groups*

It is also possible to review the association of the profiling tool's risk groups with ALMPs catering for the different types of employment obstacles identified in section 5.3.2. Here more could be done to differentiate the low and medium employability groups. When looking across ALMPs that serve general and geographic needs, there is not much differentiation between those in the low and medium employability groups (Table 5.5). Better differentiation would allow ALMPs to be better targeted towards those with the lowest chance of finding employment, so that prospective labour market disadvantage could be alleviated through greater support.

### Table 5.5. Differentiation in the profiling tool between low and medium employability could be improved for ALMPs which cater to general, geographic and skills needs

Association between profiling risk group and ALMPs addressing specific labour market needs

| Relative to high employability: | ALMPs which cater to specific needs: | | | | |
|---|---|---|---|---|---|
| | General | Geographic | Health | Integration | Skills |
| Medium employability | 1.3646*** | 0.7346 | 2.0096 | 2.1207*** | 0.8337* |
| Low employability | 1.4021*** | 0.5065** | 3.0382* | 5.5452*** | 0.4073*** |

ALMPs: Active labour market policies.
Note: Odds ratios reported, where any value greater than one implies higher probability and any value less than one lower probability. For example, 1.2 would indicate a 20% greater chance, 0.8 would indicate a 20% smaller chance. Results based on a logistic regression of ALMP entry using risk profiling groups as explanatory variables. Individual employability groups as designated by the SEA profiling tool. ALMPs grouped by type of obstacle they primarily address, categorised using a qualitative description of programme content by the SEA and programme documentation. Stars denote statistical significance- * 5% confidence level, ** 1% confidence level, *** 0.1% confidence level.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative data.

StatLink https://stat.link/yflx3q

ALMPs designed to address skills gaps (for example training programmes provided by employers) need particular attention so that individuals with worse employability participate more. Here individuals with high employability are the most likely to participate in ALMPs addressing skill needs. Those with medium employability are also more likely than those with low employability to participate. The pattern of participation in these ALMPs reinforces existing labour market disparity between groups and those with the most need for further upskilling are the least likely to participate in these ALMPs. Redressing this imbalance will help to mitigate disparities in labour market outcomes and will improve the lot of those with the greater difficulty of labour market integration.

*ALMPs addressing health and integration needs have higher participation from those with lower employability*

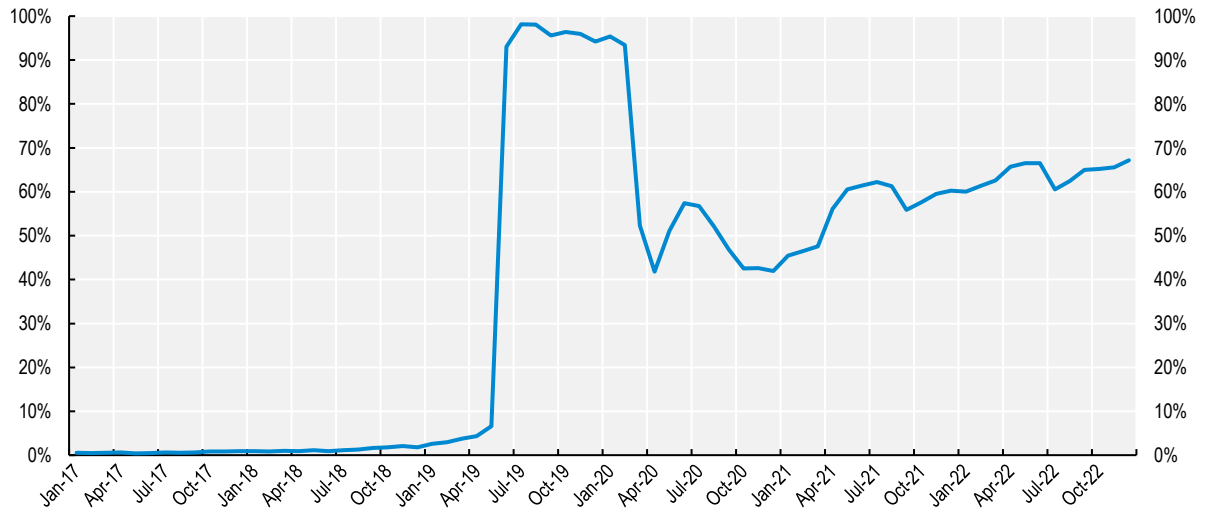
For ALMPs that address health and integration needs, there is a higher likelihood that those with the greater needs participate. Individuals in the low employability category are over five times more likely than those with good employment prospects to participate, and this likelihood is also higher than those with medium employability. People in the medium employability group are also more likely to participate than those with good labour market prospects. Similarly, individuals in the low employability group are the most likely to participate in ALMPs intended to address health barriers.

### *5.4.2. Ensuring that all registered unemployed individuals are profiled will provide counsellors equal access to information for all*

Data on profiling show that profiling information is missing for a significant minority of individuals and therefore these individuals do not have an associated employment risk grouping. After an initial roll-out of the profiling tool in 2019, the proportion of monthly cohorts of registered unemployed individuals with profiling information dropped and never fully recovered (Figure 5.3). The timing of the decline coincides with the onset of the COVID-19 pandemic and the related health measures. All in-person visits were cancelled and re-scheduled for a future date and communication was carried out using telephone and internet. But since the easing of restrictions and return to normality, the proportion of unemployed individuals with profiling scores has not recovered to its previous levels. By March 2022, all visits had been re-instated in person, rather than using telephone appointments.

**Figure 5.3. Data on profiling are missing for many jobseekers registered with the SEA**

Proportion of individuals with profiling information, by month of unemployment registration




Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative data.

StatLink https://stat.link/9kinwu

This missing information for some jobseekers means that counsellors have to make decisions on ALMP referral without recourse to the same information for all. This may affect their provision of information to individuals on which ALMPs may be beneficial to them and also on the likelihood of any referral to different ALMPs.

### *5.4.3. Testing the implementation of a profiling tool would enable the determination of its effect on changing referral patterns*

The existing SEA profiling tool was introduced without a formal counterfactual evaluation in its implementation period, which makes an analysis of its impact problematic. A qualitative evaluation was completed after the initial pilot, using data collected from regional office employees, that facilitated the further development of the profiling tool content. This chapter examines whether individuals from different employability risk groups are more or less likely to enter ALMPs that have been designated for them (and that the profiling tool should direct them to). However, this is not the same thing as knowing whether the

profiling tool is causing participation in these different ALMPs. It may simply be that counsellors and individuals were already making decisions into which ALMPs to enter, regardless of whether the profiling tool was utilised or not.

As Figure 5.3 demonstrated, the current profiling tool was simultaneously introduced nationwide, which limits the opportunity to look at individuals that are subject to profiling and those that are not in the different regions. It is only possible to look at individuals right before and right after the introduction of the profiling tool in 2019, to determine whether those that were subject to profiling enter into different types of ALMPs than those that were not. However, this analysis is not feasible due to the temporal factors that see ALMP participation reducing over time. It is also important to note that a previous profiling tool did exist, so that individuals who entered before the introduction of the new profiling tool were profiled using the old tool.

A falsification test that compares "before/after" cohorts in the same months, the year prior to the introduction of profiling (where there is no before and after and no individuals are profiled using the new tool), shows differences in the likelihood of entering different ALMPs (Table 5.6). This is likely related to that temporal decline in participation and means that any similar analysis of "before/after" cohorts around the time of the introduction of the profiling tool will also be subject to such confounding factors.

### Table 5.6. The impact of the introduction of risk-profiling on ALMP participation is indeterminable

Impact of active labour market policy (ALMP) participation of June-August cohorts compared to March-May cohorts

| | Services | Training | Employment Incentives | Job Creation |
|---|---|---|---|---|
| With risk profiling (2019) | 0.9077** | 0.9166* | 0.9340 | 0.8031* |
| Falsification (2018) | 0.9067* | 1.1433* | 0.8475 | 0.8937 |

Note: Compares the relative likelihood of the June-August registered unemployed cohort entering different types of ALMP, relative to the individuals that start in the months March-May. For example, a value of 1.2 would indicate that the June-August cohort was 20% more likely than the March-May cohort to enter a particular type of ALMP, whereas a value of 0.8 would indicate it would be 20% less likely. Stars denote statistical significance- * 5% confidence level, ** 1% confidence level, *** 0.1% confidence level.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative data.

StatLink https://stat.link/yh3tsp

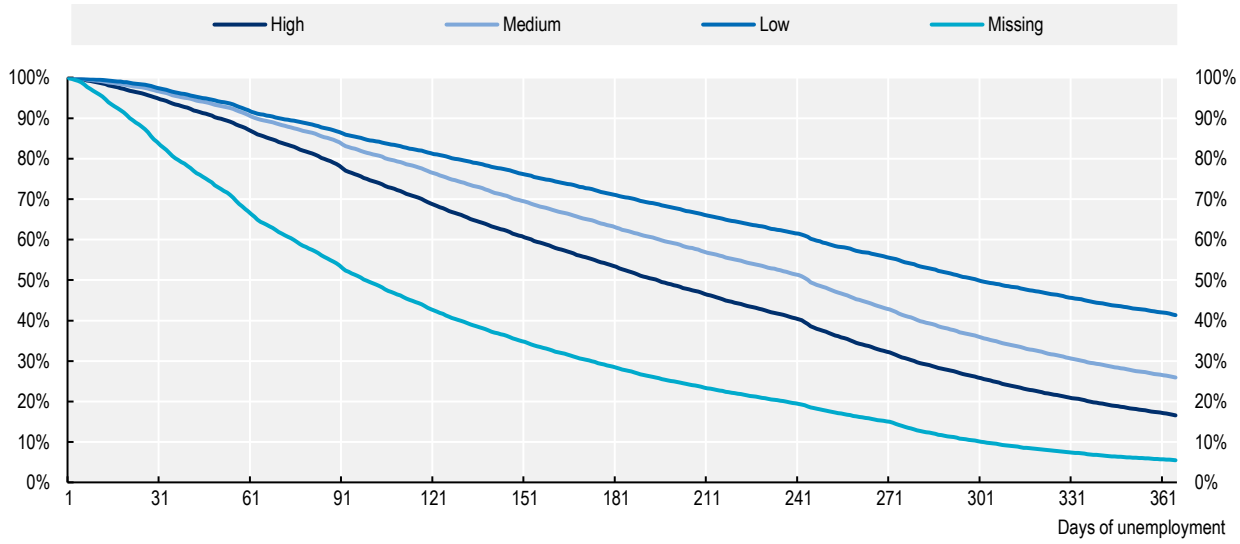
It is not possible to use cross-sectional variation in profiling application to test its impact either. Figure 5.3 also shows that, after April 2020, profiling information is recorded for some but not all registered unemployed. If the selection of jobseekers who are profiled was random, one could examine the impact of profiling on ALMP referrals. Figure 5.4 shows that jobseekers without profiling information leave the unemployment register more quickly than any of the profiled groups, suggesting that there are non-random differences between groups. For example, those individuals with better recent labour market experience or better education might be better able to find a job quickly, therefore there may be more of these individuals in the group without profiling information. If the group without profiling information were similar to the groups with profiling information, the expectation would be that their expected length of time in registered unemployment was similar to a weighted average of those groups (for example, somewhere around the line for the medium risk group in Figure 5.4).

The lack of information on the date of the profiling scores makes it challenging to conduct further analysis, because it is unknown whether individuals are profiled right after they register with the SEA or some other point in time (in theory, all profiling should be completed within 31 days of registration with the SEA. But profiling is completed at the first meeting with the jobseeker, so it may occur after this point if the meeting is not held within that timeframe).

Looking forward, it will be important to have a pre-defined evaluation plan when any new profiling tool is implemented in the future. This will make identification of its effect on ALMP participation much easier to determine. For example, by rolling out any tool over time, and randomly determining which counsellors or branches will implement the tool first, it would be possible to generate variation which would allow the effects of the tool on individuals' ALMP participation to be identified. Having such information is essential in determining how the profiling tool influences the behaviour of individuals (counsellors and clients) in making their ALMP choices.

### Figure 5.4. Individuals without profiling information leave registered unemployment much faster

Proportion of cohorts left registered unemployment by risk profiling group, days of unemployment




Note: Plots Kaplan-Meier survival curves which are right censored for ongoing registered unemployment spells. This estimates the number of individuals left in registered unemployment at any point in time, but takes account of the fact that some unemployment spells are still ongoing.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) administrative data.

StatLink https://stat.link/hpmx14

## 5.5. ALMP participation is mapped against individuals' needs

This section reviews how well the obstacles that have been identified as potentially hindering individuals' progress in the labour market are matched against participation in different ALMPs that cater to these particular needs. It extends the previous section by looking further into the particular types of barriers and how these are associated with participation in different ALMPs. This analysis can provide more insight into how the profiling tool might be amended to incorporate different information to direct individuals to the correct ALMPs. For example, rather than simply count risk factors as is done now, different weights could be given to different risk factors depending on the strength of their association with obstacles to employment.

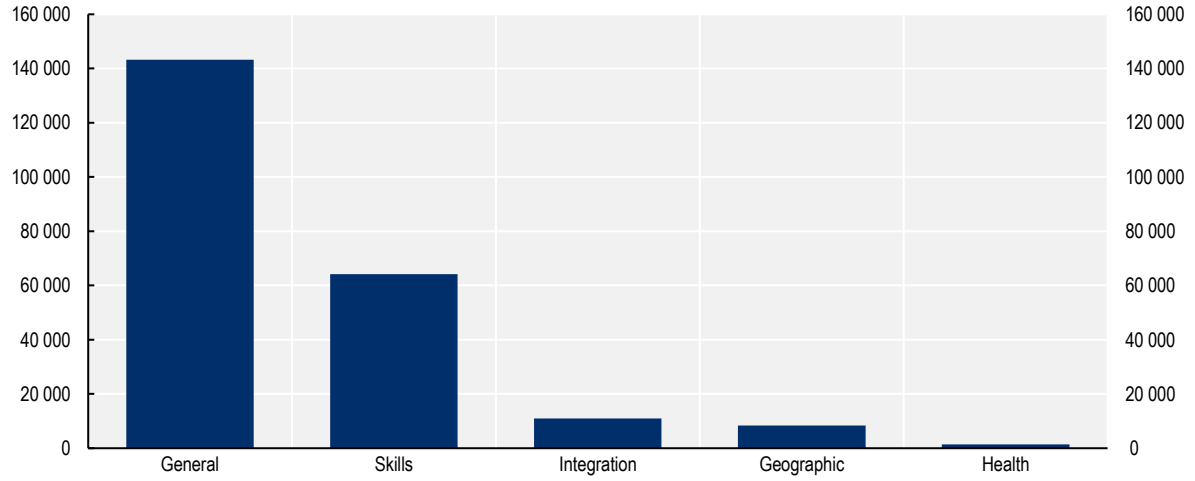
The analysis which looks at how participation is related to specific barriers is restricted to only those individuals identified as having greater need of assistance to find employment in the labour market (those with weak labour market attachment).

### *5.5.1. The prevalence of general ALMPs means that most individuals do not get ALMPs targeted to their specific obstacles*

The package of ALMPs offered by the SEA means that individuals are most likely to participate in ALMPs that serve general needs (Figure 5.5). General ALMPs comprise almost two-thirds (62%) of the different types of ALMPs that individuals receive, leaving one one-third which are targeted towards specific obstacles that individuals might face. The targeted ALMPs are overwhelmingly comprised of ALMPs which are designed to ameliorate skills needs (this group comprises 76% of the targeted total). Increasing the proportion of ALMPs which target specific barriers would help to ensure that individuals are able to address the individual specific obstacles to employment that they face.

**Figure 5.5. Individuals most commonly participate in ALMPs serving general needs**

Number of individuals having undertaken different ALMPs, grouped by type of labour market need ALMP addresses




Note: Groups count whether an individual has ever received the specific active labour market policy (ALMP) type in the first nine months of their registered unemployment, such that multiple occurrences of the same type of ALMP would only be counted once.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) administrative data.

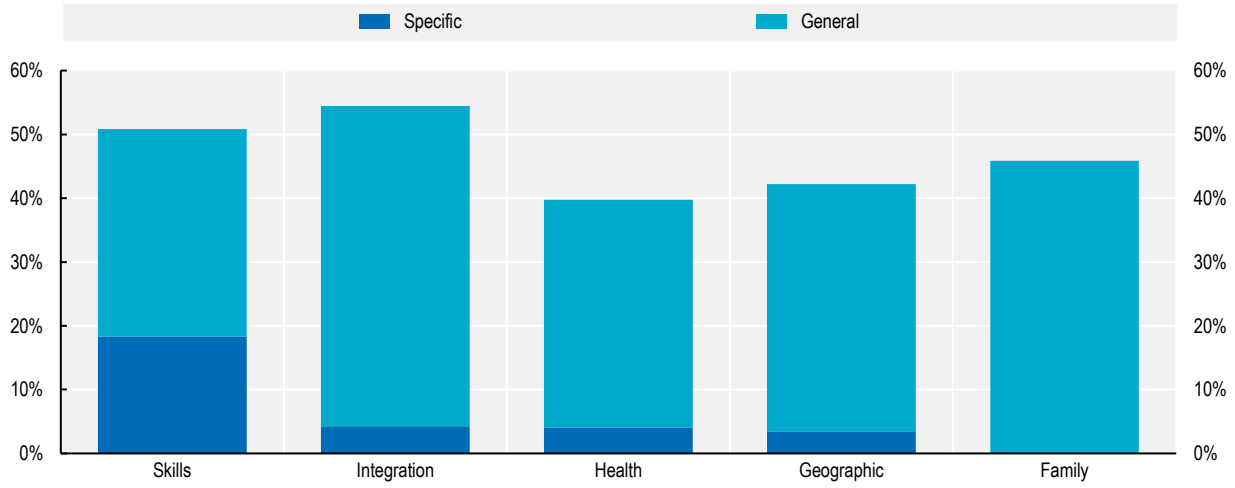
StatLink https://stat.link/s45geq

### *5.5.2. Individuals with skills obstacles are mostly likely to participate in an ALMP that addresses their specific needs*

Individuals with skills needs are most likely to have their particular needs directly addressed by an ALMP (Figure 5.6). Despite skills barriers being the most prevalent across registered unemployed individuals, the large number of ALMPs addressing skills needs mean that individuals with these barriers are still more likely to have their needs addressed, relative to the other types of barriers face. By contrast, the absence of any ALMPs directly addressing family-related obstacles means that individuals with these barriers do not get them catered for at all. This may be due to institutional design, as the SEA is not responsible for providing care services, but in this instance it means that links with the appropriate institutions are essential to ensure policies between institutions are holistic and linked-up. Individuals with geographic, health or integration barriers have a similar likelihood of having their specific obstacles addressed via an ALMP. This likelihood is fairly low across all of these groups (for example 10% of individuals with a health obstacle participate in an ALMP addressing health needs, whilst the similar figure for geographic and integration needs is 8%). The same caveat on agencies joining together to design policies holistically also applies across other areas, such as health and integration.

## Figure 5.6. Individuals with skills needs have these needs addressed most commonly

Proportion of individuals participating in ALMPs grouped by labour market obstacle




Note: A specific active labour market policy (ALMP) is one where the primary obstacle addressed by the ALMP matches the type of obstacle that an individual has.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative microdata.

StatLink https://stat.link/a4036w

### *5.5.3. General ALMPs are associated with participants who have more employment barriers but efforts should be made to encourage non-native participants and those with less education*

Participation in ALMPs that address general labour market needs is higher overall for those individuals presenting the different labour market barriers identified. For example, this means that across the barriers identified as potentially limiting labour market integration, individuals having these barriers are more likely to participate in ALMPs. Individuals with long periods of inactivity are 21% more likely to participate in general ALMPs than those without such inactivity and ex-prisoners are 41% more likely to participate than individuals without previous prison sentences (Table 5.7).

However, there are specific obstacles that are not associated with greater participation in general ALMPs. For example, individuals with only primary level education, without Latvian writing or reading skills, or without Latvian nationality are less likely to participate in general ALMPs. Increasing the weight of these characteristics in the profiling tool could help counsellors give stronger recommendations and referrals to these individuals in ALMPs that could further help them to find employment.

## Table 5.7. ALMPs addressing specific needs have differing success in attracting participants with these needs

Odds ratios of individual characteristics on active labour market policy (ALMP) participation

| | ALMPs primarily addressing: | | | | |
|---|---|---|---|---|---|
| | General | Skills | Geographic | Health | Integration |
| **Skills obstacles** | | | | | |
| Post-secondary (relative to tertiary) | 1.2437*** | 0.7967*** | 1.0886 | 1.0466 | 1.5687*** |
| Secondary (relative to tertiary) | 1.0642*** | 0.6436*** | 0.8869* | 0.971 | 1.8415*** |
| **Primary or less (relative to tertiary)** | 0.9066*** | 0.3586*** | 0.5158*** | 0.8733 | 2.5467*** |
| No computer skills | 0.8062*** | 0.5857*** | 0.6661*** | 0.7328*** | 1.3073*** |
| No Latvian skills | 0.8463*** | 0.9752 | 0.8253** | 0.7952* | 0.9562 |
| **Geographic obstacles** | | | | | |
| High LM weakness area (relative to other area) | 1.3178*** | 1.2094*** | 1.0192 | 1.3177** | 1.0750* |
| Low vacancy area (relative to other areas) | 0.8131*** | 0.9061* | 0.927 | 0.8019 | 0.7434*** |
| **Health obstacles** | 1.0776*** | 1.1534*** | 1.1273 | 16.9754*** | 1.3037*** |
| **Family-related obstacles** | | | | | |
| With family responsibilities | 1.0148 | 1.1976*** | 0.8574** | 0.6597*** | 0.4730*** |
| With caring responsibilities | 0.8448 | 1.1322 | 1.0969 | 3.2101*** | 1.7019*** |
| **Integration obstacles** | | | | | |
| 3 years inactivity | 1.2080*** | 1.0910*** | 1.3260*** | 1.6422*** | 1.7715*** |
| Ex prisoner | 1.4084*** | 0.4467*** | 1 | 0.8873 | 0.9569 |
| Not Latvian | 0.8888*** | 0.9065*** | 0.6711*** | 0.7889** | 0.8898*** |

Note: Odds ratios reported, where any value greater than one implies higher probability and any value less than one lower probability. For example, 1.2 would indicate a 20% greater chance. Stars denote statistical significance- * 5% confidence level, ** 1% confidence level, *** 0.1% confidence level.
Source: OECD calculations based on Latvia's State Employment Agency (SEA) and Latvian State Social Insurance agency (SSIA) administrative data.

StatLink https://stat.link/x24pqf

### *5.5.4. ALMPs addressing skills needs should be better targeted to those with lower education and poor digital skills*

Redefining the profiling tool so that it better maps individuals with specific obstacles to ALMPs that address these obstacles would be particularly beneficial to individuals with skills obstacles. Despite those with skills needs being most likely to have them addressed by an ALMP, still less than 20% of individuals with skills needs have these addressed by an ALMP targeting skills gaps.

The association between participation in ALMPs targeting skills and previous educational attainment runs in exactly the opposite direction. Those with the lowest education are the least likely to participate in skills-enhancing ALMPs and those with higher education levels are most likely to participate. For example, those individuals with primary education or less have only one-third of the likelihood as those with tertiary level education to particate in ALMPs addressing skills, and even those with post-secondary education are 20% less likely to participate than those with tertiary education. This would mean that if each education group started with the same number of jobseekers, for every 10 tertiary-educated participants in skills-based ALMPs, there would be only 3-4 primary-educated individuals and 8 post-secondary-educated individuals.

Individuals with primary level education or less are only one-third as likely as those with tertiary education to participate in such ALMPs. A profiling tool that gave more weight to those with lower education would help to ensure that individuals with the least pre-existing human capital were able to participate in policies which help them to gain the skills needed to gain good jobs with good prospects. Similarly, ensuring that

programmes are available that cater for the specific skills needs of individuals is important so that counsellors have an appropriate set of ALMPs to refer individuals to.

Not having any computer skills recorded is also associated with a lower participation likelihood in ALMPs offering skills improvement. Offering more courses which enable individuals to build up basic and intermediate computer skills could be beneficial in unlocking jobs for individuals that they are currently out of the labour market because of limited computer skills. This is important in modern digital economies where the proliferation of jobs with some digital content means that more opportunities are available for those people with decent IT skills.

### *5.5.5. More efforts could be made to better target integration measures to non-Latvians and ex-prisoner*

ALMPs that help with barriers to integration (such as long periods out of the labour market or having been in prison) less likely to have non-Latvians participate in them, relative to Latvians. There is also no positive impact of being an ex-prisoner on the likelihood of participation in ALMPs aiding integration, relative to other individuals.

ALMPs that help with integration needs, for example measures that are targeted to the long-term unemployed and temporary paid public works scheme, aim to provide individuals with additional support to overcome barriers that are more difficult to address via shorter interventions (such as general counselling support) or are more difficult to address through other ALMPs (like re-training programmes). ALMP support has to accommodate the diverse and challenging needs of these individuals such to provide them with the vital guidance and support they need to re-integrate into society and the labour market.

Non-Latvian nationals are 11% less likely than Latvians to participate in integration measures. The need to ensure good government policy to help with the integration of migrants is something which is common across all countries and in all government policy domains. ALMPs are an important part of the support for these general integration objectives. Access to information which appropriately signposts counsellors to the needs of this group will help to ensure that individuals who have moved to Latvia and are meaningfully participating in the labour market can access ALMPs that can unlock the barriers to employment that they may have.

Although the group of ex-prisoners is relatively small in number, they face a range of different barriers to employment. Encouraging the use of ALMPs targeting integration for this group would permit more individuals to benefit from their support.

### *5.5.6. ALMPs targeting geographic barriers are not well targeted to areas with particular labour market needs*

Currently there is no good evidence to suggest that individuals from areas with weak labour market attachment are more likely to participate in ALMPs that try to overcome geographical barriers, via support for mobility to expand geographic job search horizons. Neither being in an area with few vacancies per jobseeker, nor being in one with many jobseekers with limited labour market attachment is associated with increased entry into ALMPs addressing geographical needs.

The current profiling tool only includes transport as a barrier in its risk categorisation and the signposting to different ALMPs. Revising the guidance and support given to counsellors, to take account of broader regional dynamics (such as the number of vacancies and strength of the local labour market) could help to ensure that regions in Latvia are not left behind and that every individual is able to fully participate in the Latvian economy, regardless of their location.

### *5.5.7. Individuals are well directed to ALMPs that cater for their health needs*

The likely of participation in an ALMP addressing a health need is 17 times as high for those individuals with an identified health barrier. This is also likely to be related to specific eligibility conditions for such ALMPs, that preclude participation unless specific conditions are met. For example, the Minnesota programme that addresses addiction problems that hinder labour market participation is conditional on first having a registered addiction diagnosis.

## 5.6. Conclusion

This chapter has shown that jobseekers in Latvia have a range of obstacles that prevent them from achieving their full potential in the labour market. These obstacles encompass a wide range of needs, across skills, health conditions, geographic challenges, family-related factors and integration barriers. Registered jobseekers with weaker past labour market attachment are also more likely to have these barriers, often several of those at the same time. A suitable suite of ALMPs available to address these needs is an important part of the SEA's toolkit. Previous counterfactual impact evaluation of Latvia's ALMPs has shown that they are successful in increasing the employment of participants, underlining the importance of ensuring they are sufficiently available to help jobseekers find work (OECD, 2019[2]).

The SEA makes use of a profiling tool, that groups individuals into three broad risk groups and recommends a range of different ALMPs for these groups. For those with low employability, the tool does a good job at directing individuals to participate into the ALMPs that are designated for them. However, those ALMPs designated for those with medium or low employment prospects are more frequently undertaken by those with high employment prospects. On top of this, the current ALMP participation patterns of individuals are not always that well aligned with the specific obstacles that these individuals face. Re-calibrating any profiling tool, so that it more accurately maps individual needs to ALMPs that address these needs, will help counsellors to refer their clients to the ALMPs that address their specific needs well. This is particularly important for ALMPs addressing skills barriers, given they are the most prevalent specific ALMP offered, but lower educated individuals are less likely to participate. Similarly, care should be taken when designing eligibility conditions for ALMPs, so that they are available to individuals which have need for them.

Restructuring the basket of ALMPs offered, so that more ALMPs which address specific needs are undertaken, will also help to ensure that more individuals are given well-targeted support. For example, this could be to ensure that any new funding to expand the reach of ALMPs and to reverse the recent relative decline in participation is focussed on ALMPs which address specific barriers, rather than those which serve general needs.

Increasing co-ordination with other agencies which provide other social services could help to make sure ALMPs are able to address specific needs. For example, better join-up between the SEA and agencies which provide services on family and caring responsibilities could help to ensure that any individual who is offered work, or has time commitments, as a result of ALMP participation has the appropriate wrap-around care directly available to enable their participation.

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# 6 Detailed recommendations for modernising the State Employment Agency

The State Employment Agency in Latvia (SEA) needs to modernise its digital backbone to better support jobseekers, persons at risk of unemployment and employers in Latvia. Key priorities for the SEA are to develop a comprehensive digitalisation strategy to establish the objectives and relevant frameworks, and develop a dedicated analytics system consisting of a data warehouse and a Business Intelligence tool. In addition, the SEA should consider to gradually improve the design and implementation of the jobseeker profiling tool, continue co-operating with other organisations to find feasible solutions for skills profiling, and move towards competency-based job matching. While the SEA does not have an urgent need to fundamentally change or replace its main operational IT system in the near future, some fine-tuning will be necessary, particularly concerning system and data security, and data quality management.

## 6.1. Introduction

This chapter provides detailed recommendations to support the State Employment Agency (SEA) to modernise its digital backbone and help the SEA in its role to help jobseekers, persons at risk of unemployment and employers in Latvia. This chapter, building on the assessments in Chapters 2 to 5 and complementing the high-level recommendations made in Chapter 1, makes detailed in-depth technical recommendations for improvements in the overall IT infrastructure of the SEA, as well as specific digital tools within the broader system, particularly the jobseeker profiling, skills profiling and job matching tools.

Overall, the SEA does not have an urgent need to fundamentally change or replace its main operational IT system in the near future, although some fine-tuning to the system should be feasibly made, particularly concerning system and data security, and data quality management. Key priorities for the SEA are to develop a comprehensive digitalisation strategy to establish the objectives and relevant frameworks, and start the development of an advanced data analytics system consisting of a data warehouse and a Business Intelligence (BI) tool. In addition, the SEA should consider to gradually improve the design and implementation of the jobseeker profiling tool, continue co-operating with other organisations to find feasible solutions for skills profiling, and move towards competency-based job matching.

## 6.2. Capacity of the system of active labour market policies in Latvia

Empirical evidence from counterfactual impact evaluations have demonstrated that Latvia's ALMPs help people become employed, but Latvia's low funding levels for ALMPs limits their reach. Past impact evaluations, including one conducted by the OECD, indicate that training and (private sector) wage subsidy programmes are effective at placing most groups of jobseekers into employment. These evaluations have employed counterfactual impact evaluation techniques to account for the counterfactual (unobserved) outcomes that individuals would have experienced if they had not participated in ALMPs. This approach allows to identify the effects that can be directly attributed to programme participation. For almost all groups of participants, the training and (private sector) wage subsidy programmes that were examined were found to improve participants' labour market outcomes, such as employment probability and earnings (although the magnitude of the effects did vary across programmes as well as groups of participants). However, Latvia's spending on ALMPs remains much lower than that of other OECD countries, with funding remaining largely reliant on EU funds (which from past experience have sometimes been associated with difficulties in implementation). Increasing ALMP funding from the national budget could thus expand the reach of ALMPs and improve labour market outcomes for more jobseekers, as well as people at risk of job loss.

Continuing to regularly conduct impact evaluations and further strengthening the evaluation activities, including on the effectiveness of more intensive and skilled counsellor-based support, could also help strengthen the business case for increasing ALMP funding. For example, several studies in other OECD and EU countries have shown a positive effect of increasing the intensity of counselling, especially in situations where jobseekers are otherwise not subject to frequent counselling in practice (Schiprowski, 2020[1]; Crépon et al., 2013[2]; Glover, 2019[3]; OECD, forthcoming[4]). However, the effects of PES actions and ALMPs can vary across the design and implementation of the specific intervention, the economic and labour market context, as well as different groups of jobseekers (or even across different types of counsellors implementing the intervention, or the level of counsellor skills and qualification). Rigorous impact evaluations could thus help establish the extent to which different interventions are (cost) effective and provide an empirical justification for hiring more (skilled) staff in the SEA, upskilling the SEA staff and supporting them with better (digital) counselling tools, as well as making the business case for higher wages, and/or increasing spending on other ALMPs.

More broadly, increasing the wages of the SEA staff – possibly in parallel with a strengthened monitoring and accountability framework – could also address some of the challenges discussed in this report. In particular, many of the IT challenges require experts who may command higher wages in the private sector, with departures of qualified staff further compounding the challenges for those who remain. Even if large components of the IT development and operations are contracted-out to external providers, having suitable numbers of competent staff in-house is important even if their role is limited to managing the contracts with the external providers. To the extent feasible within the public sector wage system, introducing performance-based pay could help introduce some financial incentives for performance while attracting a wider array of staff. This should be done within a broader increase in the budget available for paying PES counsellors (so that their average wages would increase with such a reform).

## 6.3. Digitalisation strategy and resources

Digitalisation is addressed extensively in the SEA's general strategy for 2021-23, rightfully recognising the SEA's IT infrastructure as a key prerequisite to achieve the set objectives, and increasing the effectiveness, efficiency, accessibility and user-friendliness of the SEA's services.

### *6.3.1. A dedicated digitalisation strategy would pave a clear pathway to modernisation*

The SEA could consider developing a dedicated digitalisation strategy to address the aspirations and challenges more comprehensively and paving a more systematic pathway for modernisation, going beyond the few key digitalisation projects highlighted in the general strategy of the SEA. According to recent information collected by the OECD from most OECD and EU countries, about a quarter of PES systems in the OECD and EU countries have a dedicated digitalisation strategy (Brioscu et al., Forthcoming[5]). Another quarter has included a digitalisation component in the general PES strategy similarly to the SEA, while half of the PES do not follow a strategy in their digitalisation projects or use only related national strategies, concepts and guidelines that involve all organisations in the public sector or beyond.

The digitalisation strategy should declare the overall objectives and principles for the digital transformation, helping to prioritise any related investment and providing a clear framework for digitalisation. For example, Australia has articulated four key shifts in its Digital Business strategy for employment services: i) simpler access, ii) consistent experience, iii) data driven services, and iv) modern, connect and digital – all of this to be delivered by leveraging modern platforms and approaches. Austria has laid out in its PES digitalisation strategy a roadmap for five to eight years, aiming to fundamentally renew PES digital backbone technically and functionally, starting with the placement and online services. The Swedish PES has both a Digital transformation strategy and a Digital strategy to comprehensively lay down the relevant objectives and principles, and the PES system in Korea has a thorough digital strategy to holistically address their digitalisation and data management journey (see Box 6.1).

#### Box 6.1. Strategies for PES digitalisation in Korea and Sweden

**A strategy for a "digital first" approach in Sweden**

The Swedish public employment service (PES) has a comprehensive digital strategy. The main principles of the digital strategy are to: provide a digital ecosystem, provide data security, have data readily available, and to achieve value for customers, including through a "digital first" set up.

The digital strategy aims to achieve more efficient matching of jobseekers with vacancies and an improved and more productive working environment at the PES. The Swedish PES hopes that the

strategy will provide an efficient internal development process that supports a cohesive delivery to customers.

A comprehensive "digital first" approach is a key part of the strategy. "Digital first" concerns everyone at the PES, and includes more digital meetings, and more digital solutions for PES customers to meet their needs. Other design principles beyond the "digital first" approach include a customer and solutions focus, developing tools for accessibility and inclusion, delivering fast, adopting data-driven insights, and maintaining transparency.

**Better informing PES customers in Korea**

Korea also has a digital strategy for PES. The objectives of the digital strategy include increasing the use of employment services, making sure clients are better informed about employment services, and better providing labour market information to customers.

Korea hopes to achieve these objectives using several methods. This includes making sure that employment services are delivered in different ways so that customers can choose the method that suits them best. Korea will also ensure information on employment services is clear and comprehensive, and that the information only needs to be collected once from customers (once-only data collection principle to be achieved via data exchange across administrative registers).

Korea recognises that different customers need different support. To tailor support, Korea plans to make better use of data and artificial intelligence. It also aims to target support depending on the customer's age and stage in life. Furthermore, Korea is implementing counselling support that is tailored to jobseekers' competencies and skills.

Further into the future, Korea will provide a "one-stop" online employment service for individuals and companies called *Employent24*. *Employment24* will provide "next-generation" digital employment services, that combine information on jobs, vocational training, and grants. It will also provide information on services available to employers including on training and wage subsidies for employees. Career development information will be provided to jobseekers through *JobCare*, a platform for comprehensive resources for career management.

Source: OECD questionnaire on digitalisation in Public Employment Services to support the provision of active labour market policies launched in March 2023; OECD (forthcoming[6]), *Strengthening Active Labour Market Policies in Korea*; OECD (2023[7]), "Addressing the legal and IT challenges of data exchange to support contracted-out employment services in Sweden," www.oecd.org/els/emp/Sweden_Challenges_Data_Exchange.pdf.

### *6.3.2. The digitalisation strategy needs to propose a route to achieve sustainable budget and mechanisms to ensure cost-effective investments in digitalisation*

Moreover, the SEA should think through how to achieve sustainable financial and human resources for IT developments while developing the digital strategy. Continuing with limited and project-based resources poses serious risks for a more sustainable modernisation and comprehensive digital approaches, enables only a patchwork of adaptions and functionalities, as well as forces more often to opt for a scaled-down versions than the ideal. Nevertheless, even in the context of a more viable digitalisation budget, bringing in additional project-based resources (e.g. EU funding) and co-operating with other Latvian and international organisations would remain important to maximise the resources available for the digital transformation. Thus, the mechanisms to attract additional funding and build partnerships should be addressed in the SEA digital strategy.

The SEA digitalisation strategy should also address how to maximise the value-added of its new and updated digital solutions, i.e. to maximise the effectiveness and efficiencies that these solutions incur

functionality wise, as well as to ensure take-up and avoid staff resistance to allow the positive effects to materialise. The SEA should develop systematic approaches to involve end-users throughout the development processes to increase value-added of the new digital solutions. The end-users should be involved already in the stage of developing the concepts and not only in the testing stage when the main functionalities have been already developed, only to identify bugs (OECD, 2022[8]). The involvement of the SEA staff as one group of end-users should be particularly prioritised and most feasible to systematically involve, while the ways to involve other user groups (employers, jobseekers, partners) in the development of the SEA online services and incorporate their views and feedback should be established as well.

The two-way communication between the development side (the business unit in the SEA that "owns" the digital solution and the IT unit) and the users (SEA staff, jobseekers, employers, partners) need to continue even once the solution is deployed. Feedback from users supports continuous improvement and fine-tuning of the digital solutions. Communication to users involving guidelines and user support channels further ensures an appropriate use and take-up of the digital tool by decreasing the hurdles and resistance to use it and helping to raise awareness and understanding how it functions and how to incorporate it seamlessly in the work processes.

The digitalisation strategy should also envisage a monitoring and evaluation framework for digital tools in the SEA to understand the performance of its digital solutions, helping to fine-tune and adjust functionalities and user experience, as well as find alternative solutions for those tools that do not perform and cannot be easily fixed. In addition to monitoring qualitative feedback from users and quantitative indicators like take-up rates and user numbers, it is important to evaluate the effects of the digital tools on the SEA outcomes and the cost-effectiveness of these tools. Being able to show how the digital solutions help jobseekers, people at risk of job loss and employers, as well as the benefits that investments in digitalisation incur would enable the SEA to better communicate its solutions to the end-users, and make the business case for further sustainable funding in digitalisation. For example, an evaluation of a digital tool for job counsellors in Spain showed that this tool enabled counsellors to make better recommendations on job search and jobseekers to find better jobs quicker, and thus enabled the Spanish PES to encourage the use of this tool among job counsellors (OECD, 2022[8]).

### *6.3.3. Considering the development frameworks, processes and methodologies in the digitalisation strategy would ensure its comprehensiveness*

The SEA's digital strategy should also address the mechanisms to manage the risks associated with digital tools, such as issues concerning ethics, trustworthiness, accountability, transparency, fairness, data protection and system security. These risks are likely to amplify if AI algorithms would be harnessed to enhance digital tools (Brioscu et al., Forthcoming[5]), but can be present even in simpler digital solutions. For example, PES that are more advanced in digitalisation and adopting AI, such as Belgium (Flanders), France and the Netherlands (Pôle Emploi, 2022[9]; Scheerlinck, 2020[10]; Scheerlinck, 2023[11]), have often set up dedicated frameworks and committees to ensure new digital developments to not pose undesired risks, particularly in terms of ethics and biases.

Developing a digitalisation strategy provides an opportunity for the SEA to comprehensively reconsider its IT development approaches and processes more generally, including in terms of the development methodology. While modernising the development methodology for the tools and systems already in production might not be feasible or sensible, modern agile development methodologies could be considered for future developments. In more particular, Section 6.6.3 proposes adopting DevSecOps development methodology in the SEA.

Furthermore, the SEA needs to ensure sufficient capacity of its development partners. The SEA needs to analyse options for changing its procurement approaches to receive competitive proposals for the IT projects and ensuring development partner's commitment and available capacity in the contracts. Also more modular systems facilitate working with several development partners (see Section 6.4.1). The digital

strategy could include the pathway to achieve sufficient external capacity for developments to ensure that the milestones of the SEA digital transformation could be achieved.

The next sections discuss the different aspects that could be addressed to modernise and strengthen the SEA's digital backbone, and which could feed into the SEA's new digitalisation strategy to be developed in co-operation with the OECD and DG REFORM within the context of the same project as the current report. The strategic goals and milestones set in the digitalisation strategy should be accompanied by necessary actions, responsibilities and a monitoring framework either in the strategy itself or an accompanying action plan to ensure the implementation of the digitalisation strategy.

## 6.4. The operational IT system

### *6.4.1. A more modular architecture of the main IT system would facilitate development processes*

The main operational IT system in the SEA, BURVIS, is implemented as a monolith. A monolith is more likely to break down (have bugs) during upgrading and deploying new features than a more modular system with well-defined interactions among its modules. Thus, the current solution is somewhat fragile, which also causes hesitancy to use automatic deployment processes.

In case of a modular architecture, deploying one module (only the one undergoing the change) at a time would reduce risks associated with automatic deployment. It would also speed up the development process and adding new features, as new releases via automatic deployment could take place more frequently.

Having a more modular architecture together with automatic testing and deployment would also facilitate working with more than one development company. This would mitigate the capacity issues that can arise when working with a single provider as experienced by the SEA over the years when co-operating with the current development partner, UNISO.

A modular architecture would speed up development, as well as enable experimental development, e.g. buying specific features and even complete systems and integrating these with the existing solution using well-defined internal and external Application Programming Interfaces (APIs).

Nevertheless, changing the architecture of an existing monolith to separate modules requires considerable resources and time. Hence, developing new digital solutions that could be more easily implemented as new modules, is a more clear-cut way forward for the SEA. This approach has been also initiated with the development of the new tool to profile jobseeker skills in the SEA (see more in Section 6.9).

### *6.4.2. Introducing network-level segmentation would improve system security*

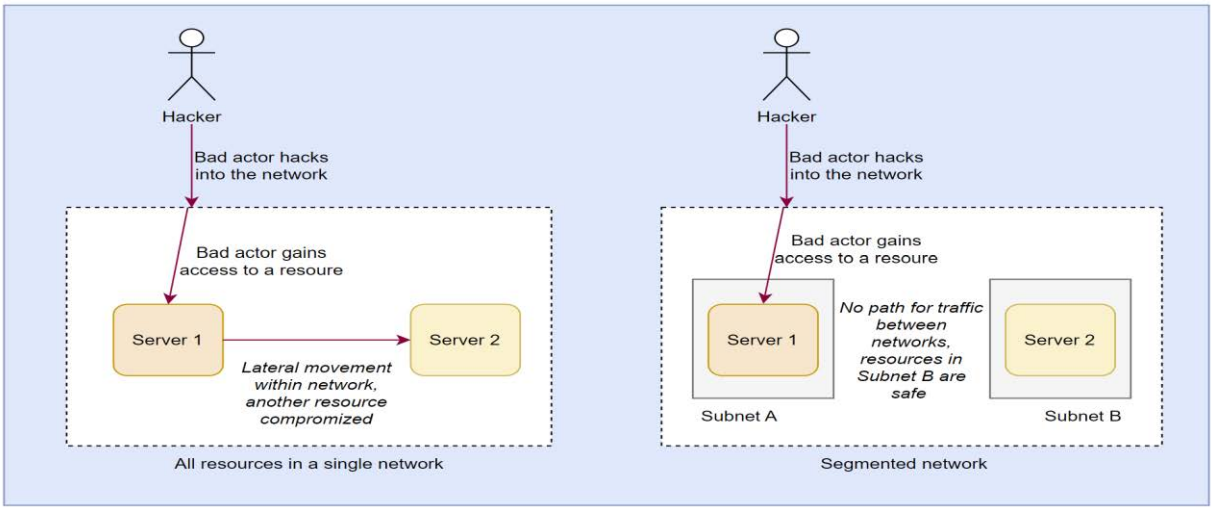
The production environment and the two testing environments in the SEA are not fully separated as these share the same non-segmented network. A network allows traffic flow between nodes (physical servers, virtual machines, applications, database servers etc.). Firewalls and other restrictive technologies apply usually on the boundaries of a network, but not within a network. While firewalls can be also inside networks, this is in practice rather uncommon. Thus, a network is a prime target for hacking. If a network is compromised (broken into), it often allows for "lateral movement", i.e. gaining access to other nodes within that network (Figure 6.1). For example, hacking into one server within a network may provide easy access to other servers in the same network.

The SEA should separate the three environments using network level segmentation. Segmentation would divide a computer network into smaller parts and thus improve network performance and security. Establishing several networks or subnets is not any more expensive or difficult like in the past when networks were a physical entity of cables and devices, as today networks are mostly virtual. At a minimum,

all production resources should be isolated from anything else, such as development and testing resources. Separating development and testing networks from the production network is particularly important as these networks do not contain real data and need to be accessed by more developers, and hence have often more relaxed access policies. Separating development and testing networks from the production network thus disables the lateral movement path from development to production and reduces risks.

### Figure 6.1. A single network is more vulnerable against malicious actors

An example of security implications in a single network vs. segmented network




Source: Author's work.

### *6.4.3. Monitoring system performance and security should take place near real-time*

System monitoring in the SEA takes place by going through logs after an incident has happened. In such an approach, issues in the system are hardly detected (near) real-time, which can be particularly problematic regarding system security related incidences.

The SEA should consider implementing a dedicated monitoring tool that offers near real-time information on the state and behaviour of the system. Such tools are typically presenting the key monitoring indicators on a dashboard with a possibility to drill down into details on specific errors or performance incidences (such as a sudden increase in response times of the system). Several products are available on the market for such monitoring tools, such as Splunk and Azure Application Insights (Figure 6.2). Adopting a tool offered by the market would require some work to implement it in the specific system, although basic monitoring capabilities can be achieved already with only small adjustments of the tool (adding an instrumentation key and some provided scripts).

**Figure 6.2. A dedicated monitoring tool offers near real-time information on the state and behaviour of the system**

An example of key system monitoring indicators on an Azure Application Insights dashboard

Source: Author's work.

### *6.4.4. The technology stack needs updating*

The technology stack of the SEA includes some technologies that are somewhat dated, as for example Java 8 is used for the interface to external registers via the VRAA access point and PostgreSQL 13 for database technology. Using old versions of any software, including Java, exposes the system to security risks because not all security fixes are provided for older versions. Although Java 8 is currently still supported, it needs to be upgraded by the SEA's development partner at least to Java 11 soon, before the support ends. Although such an upgrade would require some investment, pushing it to the future will only make it more expensive altogether.

The SEA IT system uses many external libraries (collections of resources in software development, such as configuration data, documentation, help data, message templates, pre-written codes, value or type specifications etc.), yet the SEA does not have a complete list of libraries used for BURVIS development. It is very important to manage the life cycle of libraries, including making sure that no up-to-date versions are used. Routinely upgrading to the newest versions as soon as these become available does not require investments per se, but just more systematic processes.

Upgrading any part of the digital infrastructure, including software platforms and libraries requires comprehensive testing of the system. To facilitate such comprehensive testing, the SEA needs automatic testing systems with sets of pre-defined cases of high testing coverage and sufficient test environments, because any change in codes can introduce bugs.

### *6.4.5. Deployment should be automatic*

The SEA deploys software manually (hands-on processes and individual control at each step, instead of automatic tools and scripts), which has several downsides. Manual deployment is slower, prevents frequent releases, and is more error prone than automatic processes contrary to common belief. Automatic systems perform processes as they have been instructed to do, whereas humans can get tired and make errors when performing repetitive tasks.

Automatic deployment also facilitates rolling back in case a deployed version does not work as intended, because automatic tools create a procedure for undoing the changes. As the SEA uses VMware for the virtualisation of the servers, also VMware images could be used for rollback, although these are less granular and thus the process can be less effective.

Furthermore, automatic deployment would remove the need for developers to access the SEA production environment and thus increase system and data security. In addition, the fewer people can access the production systems, the less likely are errors due to manual changes in the production systems.

The automatic deployment should be also used for database changes, e.g. when creating new or adjusting existing tables. Automatic deployment would decrease the issues with database changes by removing the possibility for human error in the process, such as typos in table/field/index or other names.

Automatic and comprehensive system-level testing is extremely important for automatic deployment in addition to unit-level testing. A new version should be deployed first in the test environment, thoroughly tested, and deployed in the production environment only once all detected errors are fixed.

### *6.4.6. A cloud solution could be considered in the future*

The current solution of having external data centres to host the SEA servers and the SEA itself maintaining the virtual layer has been sufficient for the SEA's current needs. In case in the future more scalability would become desirable (e.g. the number of simultaneous users increases and fluctuates), a public cloud-based solution could be considered instead.

#### *The cloud can offer many benefits*

A migration to the cloud can offer several advantages, for example advanced system security. The security level of the major public clouds is on a very high level, much higher than most organisations can afford on their own. Public clouds have typically 24/7 staffed locations with experts monitoring the state of the environment constantly. The public cloud data centres are generally built with several layers of redundancy, i.e. duplicated (or even more than that) power sources, network connections and computing and storage hardware.

Although the security of public clouds is often questioned, it is important to differentiate between the security of the cloud solution itself and the customer workloads (computing resources and tasks to run an application or service) within the cloud. The cloud itself is the responsibility of the cloud provider, who need to take care of securing their environments (and all the major cloud providers have so far succeeded in that). Ensuring security of the customer workloads within the cloud are the customer's (in this case the SEA's) responsibility. While the cloud itself does not itself ensure the security of customer workloads, it does offer numerous additional possibilities to secure the applications and services.

A cloud solution can offer cost savings, particularly considering possible indirect costs. For example, a smaller application like BURVIS may not be cheaper to host in the cloud per se. However, adding the time it takes to build and maintain servers in physical centres, the total costs of using a cloud solution might be lower. In addition, cost savings are more common for workloads that have highly fluctuating usage, for example mobile applications. In such cases, hosting the application requires very high capacity during the

peak loads. Contrary to having a solution of a limited number of physical servers, capacity can be easily downscaled and even adjusted automatically in the cloud. Nevertheless, such cost savings are likely only low in the case of BURVIS, as the application profile is rather stable and scaling for cost savings not as relevant.

A cloud solution can offer also more possibilities for new technologies, as these are currently developed largely in the cloud. For example, the AI technology is almost exclusively available via cloud computing. Also, many new security technologies have emerged first in the public cloud. The SEA should consider a cloud-based solution in case desiring to implement such new technologies or functionalities in the future.

*Understanding the implications of moving to the cloud*

Moving to the cloud might seem like losing control over the hosting environment as becoming not able to fix issues directly and having to wait for the cloud provider to address these issues. However, these concerns are not generally valid as the cloud providers have staff available for 24/7 and are much more likely to be able to fix any problems than most organisations by themselves even during nights and weekends. As such, instead of losing control, the sift to the cloud could be rather seen as outsourcing a better service.

It is important to understand that the risk landscape changes when moving to the cloud, as risk management becomes shared between the customer (SEA) and the cloud provider. The cloud provider would provide the framework and tooling and secure the hosting environment, but the SEA would be still fully in charge of configuring and handling its applications and data. Furthermore, the cloud can be a major target for attackers, since these host a high volume of assets. While the IT systems of a smaller organisations like the SEA might not draw hackers' attention, being a part of larger system (the cloud) can be more likely under constant hacking and other malicious activities. While the cloud provider aims to take care of the associated risks, the SEA would need to consider the implications of this context and be prepared to adjust its approaches.

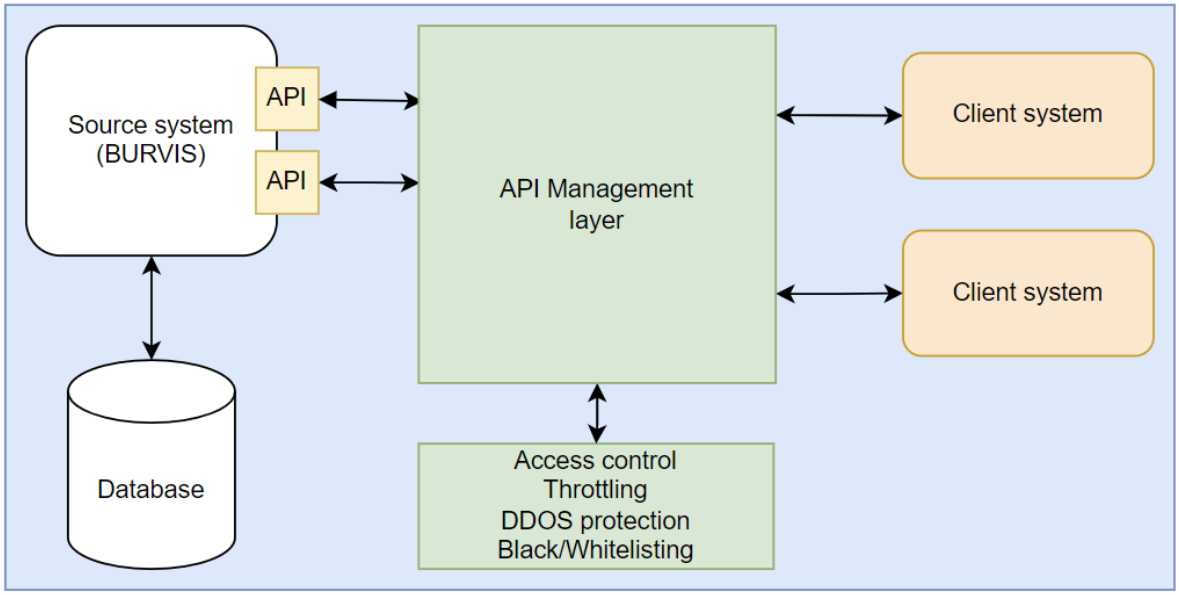
Moving to the cloud requires new skills and knowledge. While many technologies are easily transferrable to the cloud, some technologies and processes need to be adjusted, and some additional technologies become available. For example, PaaS services (Platform-as-a-Service, sometimes called "serverless computing") in the cloud means a rather different way of accessing servers or networks in an organisation's our own environments.

### *6.4.7. The SEA should deploy a modern API management tool*

Some of the interfaces for data exchange in the SEA IT system enable direct access to the BURVIS database. However, such direct database access also reveals the database structure of the BURVIS system to the external parties and creates direct coupling, thus making the external system dependent on the internal details of the BURVIS database. These features make the maintenance of BURVIS harder than necessary as changes to the database structure would affect the access of the external parties.

Deploying a modern API management tool would enable the SEA to create an abstraction layer between BURVIS and external systems (Figure 6.3). Such a tool would also provide additional useful functionalities, such as access control (to manage which parties can access), throttling (managing how many users can access at a given time, preventing attacks), key management (creating, sharing, storing and exchanging access keys), handling errors and monitoring data exchange processes. These functionalities would contribute to a better management of data security risks. The SEA should analyse the feasibility of deploying a modern API management tool, such as Apigee, MuleSoft, Azure API Management or Dell Boomi, which are reasonably priced and easy to deploy, as well as often cloud-based.

Figure 6.3. An API management tool should control access to BURVIS




Note: API – Application Programming Interface. DDOS – a distributed denial-of-service attack.
Source: Author's work.

## 6.5. Data management

Although the digital infrastructure of the SEA enables it to collect rich data to support its business processes, data management processes and mechanisms are currently quite limited. Although the SEA does not need a complete overhaul of data management, many smaller steps should be taken to improve data management and make the associated processes more efficient.

### *6.5.1. The SEA should improve the system to analyse and improve data quality*

Data quality affects all aspects of the SEA operations and digital systems, from using data to deliver services to jobseekers and employers to producing statistics and analysis and sharing data with external partners for their purposes. Yet, BURVIS application has only limited data quality checks, and data quality issues are mostly managed manually.

The SEA needs to define an official process to manage data quality issues to have clarity on how to address any identified data quality concerns. Currently, the SEA has a semi-informal system to address data quality issues as staff in the statistics unit aim to identify data issues using personalised data in case they have capacity for this task, and counsellors in local offices make the necessary changes to the data, which are then logged in the SEA's audit database. As the SEA deals with personally identifiable information, only staff members with the relevant authorisation should be allowed to edit the data, including in case of data quality issues. In addition, any such edit needs to be logged for a proper audit trail separately from application logs that might be stored for a shorter duration. A systematic process to address data quality issues also facilitates improving the digital infrastructure more generally as it creates a continuous feedback loop between users and developers.

A prerequisite for a system of data quality management is an agreed data quality standard. The SEA needs to define target levels of and acceptable variation in data quality. Aiming for 100% in data quality throughout the system can get very costly, and hence it is necessary to identify which parts of the data are the most

critical and need the highest quality. The priorities for data quality can differ between operational and analytical needs and thus the different needs should be discussed and agreed on involving all relevant data users.

All sets of data in the SEA's databases need to have clearly defined ownerships to facilitate setting the data quality standards, define when data can be considered "correct", and have clarity on who is responsible and has the final say with regards to decisions on these data more generally. The SEA has not currently defined clear ownerships, apart from all data being the property of the SEA. However, such shared responsibility is not recommended, as it tends to lead to situations where nobody might take responsibility to handle some issues assuming that someone else is handling these.

The SEA needs to implement system-wide controls over input data that enable a singular point of validation of each data element. The SEA's system is designed and built over a longer period and receives data from numerous sources (user input, APIs, integrations with other systems). In such a case, it is likely that similar data (e.g. jobseekers' addresses) are received through different mechanisms, and all these different mechanisms check for data validity separately. This can lead to problems, especially when the data validity rules change and the changes are not implemented in all sources from which data are received, leading to potentially erroneous data. Therefore, the system should entail a singular point of validating each data element, which can be done by implementing internal APIs for saving data (as well as provide data to other parties from the system). In such set-up, each route for incoming data calls the same internal API which validates the data always the same way regardless of the data source. This validation should also be used in the user interface layer of BURVIS to help job counsellors input data correctly. Implementing such functionality can be done in steps, one internal API at a time and then moving the input routes to use that API.

The SEA could implement an automated system to analyse data quality, enabling to monitor the data in the system and report any issues detected, as well as potentially automatically fix some types of issues. Such automation would help avoid human errors, as well as additional manual work. Automatically fixing data quality issues could be feasible in case duplicate entries and incorrect data formats. For other types of data quality issues, implementing alerts to indicate errors and suspicious data might be more beneficial. An automatic alerting system can have a much broader coverage in terms of potential issues than automatic corrections as it is not a destructive function.

### *6.5.2. Data retention periods need to be analysed*

The SEA logs currently all clicks, keystrokes and transactions in its digital systems in detail and has not so far deleted or archived any historic log data. The current system creates very detailed log by logging clicks and keystrokes in addition to transactions. This practice yields a very large and continuously growing log database, which is becoming problematic.

The SEA needs to analyse its logging practices and define retention periods for its different datasets. For example, application logs might not provide much value after a few months, while audit trails might need to be kept even long after the application itself has been decommissioned. Furthermore, the SEA needs to analyse which log data need to contain personal information, while all other data should be pseudonymised.

The General Data Protection Regulation (GDPR) is one of the key instruments to help assess the data management practices, including regarding retention periods of log and other data. For example, GDPR regulates retention periods of personally identifiable information after the customer relation has ended. Hence, if a jobseeker is no longer using the SEA services, they have the right to have their data deleted from the SEA' databases as their data is no longer required by the system. Thus, the SEA should have a mechanism to remove the user information in these cases from its databases completely, which should strictly speaking also apply to log data.

In addition, although a log can be used as a debugging tool, it should not be the primary tool for the debugging purpose. More suitable approaches for debugging include for example application monitoring described in Section 6.4.3.

## 6.6. System security

A system could be deemed secure only by comprehensively and continuously monitoring and testing the system and all its components. Maintaining security requires a proper design and implementation of the technical components and processes, but also continuous effort to face the existing and emerging security concerns.

### *6.6.1. Access control could be tightened*

The SEA manages access rights centrally using Active Directory, adding new staff members to appropriate groups of access rights and thus ensuring a secure implementation of access control. However, also external developers are granted access to the SEA production environment in addition to staff. In total too many people have access to the production environment, also because the deployment process is still manual.

The process of granting access to IT systems and allocating persons to access groups should be carefully designed, executed with discipline, and generate audit trail. Access rights should be never given ad hoc to the production systems or any other systems that contain production data. Also, developers should have no access to the production environments, but only to the development, test, and quality assurance environments. Moving to a fully automated deployment process would make it possible to reduce or even eliminate the developer access to the production environment, as their tasks could be automated.

Only very few administrators in the SEA should have access to the production environment, and their actions should be rigorously logged. Besides administrators, also the actions of all other people with privileged access (users with higher rights than regular users) should be logged, and the logs audited regularly to reduce insider risk and to ensure that privileged access rights are being used properly.

### *6.6.2. Continuous penetration testing is needed to face constantly evolving vulnerabilities*

Any system's security can only be proven by security testing, especially penetration testing (authorised simulated attacks performed on a computer system to evaluate its security, also known as pentests or ethical hacking).[1] The SEA performs penetration testing once a year, which is not frequently enough as new vulnerabilities emerge at least monthly, if not weekly. Hackers – malicious actors – do their own research and development work, and continuously find and invent new methods to break (into) systems. From testing a system today against all knows vulnerabilities, we can only conclude that the system is secure for today, while we have no way of knowing what new vulnerabilities emerge next week or month.

Thus, the SEA needs to test its systems against the new discovered vulnerabilities more frequently, potentially using automated testing. Automated penetration testing is available as a service from many companies, and the SEA could consider subscribing to such a service.

Continuous testing results should be logged and audited to make sure that testing is a part of a continuous improvement process and the issues found are fixed. Auditing should take place after each round of testing if feasible.

### *6.6.3. DevSecOps to integrate security seamlessly into the development cycle*

Some of the mistakes that humans make can be easy for computers to detect. For example, a piece of code or a library can be insecure due to human errors, making the system vulnerable for malicious actors. Automatic code scanning can be used to detect known security problems and vulnerabilities in codes used in the systems, as well as already before these are deployed.

One possible approach to implement automatic code scanning already from the start of developing process, is to adopt DevSecOps (short for development, security, operations) development methodology. DevSecOps is an increasingly popular practice in application security as it introduces security already from the start in the software development cycle, i.e. it automates the integration of security into the initial design (first codes) through to testing and deployment, as well as into monitoring a published product. Automation enabled by DevSecOps ensures that security issues are not forgotten or skipped in any of the steps of development and that these issues are addressed early on, when these are easier and less expensive to fix. DevSecOps could be ideally used in combination with regular vulnerability scanning described in Subsection 6.6.2.

Automation in the context of DevSecOps means adding scanning functionality into CI/CD pipelines (Continuous Integration / Continuous Deployment – a process by which software is automatically processed from source code format to a testable application), and even in source control[2] pull/merge process (the developer can create a pull request when finishing a piece of work, triggering automated system(s) to merge the new code into the existing code base, potentially in turn triggering the CI/CD pipeline). Whenever code is pulled to a repository, it is scanned by an automatic tool. Whenever a build is created (a compilation of software source code from human-readable format to machine-readable), in test, development or production environment, it is automatically scanned. By placing release gates (a decision to continue the process or not based on set criteria) that depend on the results of the scanning, it can be ensured that no vulnerabilities make their way into production.[3]

### *6.6.4. Comprehensive security processes need to support the technical components of digital systems*

Although security has technical components, it revolves mainly around processes, such as risk management, vulnerability monitoring, access monitoring, disaster recovery, logging and informing. These processes aim to establish an understanding of the current level of security, compare it to the required level of security, and identify and manage any exceptions correctly.

To manage risks, the SEA needs to document and assess the relevant risks periodically, as well as compare the risk assessments over time to see if some risks are becoming more prominent and need graver actions. Risk management means understanding the risks and their potential impact. No system is without risks and each of the risks has a cost to mitigate it. A completely risk-free environment is almost always too costly to achieve. Thus, some risks always remain, which need to be understood and managed. Typical examples are insider risks – it is extremely difficult to design a system that does not have administrators with privileged access, and with such access it is easy to steal or destroy data. This risk is often accepted, as building bullet-proof controls to mitigate it can be very expensive.

Vulnerability monitoring in the SEA needs to be a continuous process as vulnerabilities change over time. For example, a third-party library could be deemed safe today, but next week a new type of vulnerability is found in it. Doing vulnerability assessment only once when releasing the software, this change in the status of the library would not be recorded.

Also access monitoring and auditing access rights needs to be a continuous process. Typical mistakes in managing access are to forget to close accounts when people leave an organisation or close access of external partners or developers after their access is no longer needed. Only by having a strict and continuous audit across all accounts it is possible to manage associated risks well.

Disaster recovery process is part of security, as well as operative processes. Disasters (such as loss of data, loss of system functionality, denial of service etc.) can be the result of data breaches, in which case the recovery process could be initiated by the security team, instead of the operative team. The process needs to be always the same and all parties are working together to prevent further damage. It is common for disaster recovery processes to be too vague and not controlled enough, which can mean that after recovery unexpected amounts of data might be lost, or the data that did get recovered were not required. The disaster recovery process should be detailed and explicit, so that it can be followed in a very stressful situation and by people who might not have previous experience in disaster recovery.

Informing relevant officials and administrations, as well as customers of breaches and suspected breaches is an important part of security communication. While poor information can send a negative signal, a clear message together with decisive actions will send a signal that the situation is under control and being handled. Furthermore, all suspected breaches should be logged thoroughly and separately from the operational system, so that these issues and their handling can be examined later to feed into continuous learning and improvement process.

## 6.7. The digital backbone for data analytics

The data analytics solution in the SEA relies on a copy of the operational database of BURVIS, which does not have the flexibility to better adjust data for the needs of analytics or enrich the database with additional data sources. The statistics team in the SEA is able to use only limited and inflexible tools to query and process data, making the production of statistics and analysis mostly a manual process that exhibits various data protection concerns.

### *6.7.1. Introducing a data warehouse solution could greatly benefit data analytics*

A data warehouse is a central repository containing structured and semi-structured data from one or more data sources to facilitate data analytics in an organisation, particularly supporting and automating the production of regular statistics, reports and data analysis. PES systems in 74% of OECD and EU countries have set up a data warehouse to facilitate data analytics (OECD questionnaire on digitalisation in Public Employment Services to support the provision of active labour market policies launched in March 2023; the share of countries calculated based on those countries that responded to the question). Most of the data warehouses in PES include data from different internal registers on jobseekers, ALMPs and benefits, while some of these receive data from external registers (above all employment, social security, revenue, benefit, disability and immigration data) and even national statistics offices (Estonia, Germany, Poland, Spain).

For example, Poland has set up the Central Analytical and Reporting System (*Centralny System Analityczno-Raportowy*, CeSAR) that includes data from the internal registers of the PES system (data on registered unemployed people and jobseekers, services and measures provided to individuals and organisations, job offers, employment agencies and training institutions, electronic services of PES, etc.). In addition, CeSAR includes unemployment and demographic data from the Central Statistical Office, as well as data from external administrative registers on disabilities, social assistance, family benefits, alimonies, family support, foster care and childcare services.

Furthermore, 13% of PES (Australia, Belgium (Flanders and Wallonia), Korea and Sweden) have set up a data lake in addition to or instead of a data warehouse. Data lakes are used for storage of various data that are not in standardised format and may contain data errors, i.e. the data are not prepared to fit data analytics like in data warehouses, as data do not have to go through the data processing stage beforehand. A data lake can be a separate environment for data discovery where the users can test different new queries, analyse new datasets etc. Nevertheless, the priority for the SEA would be to set up a data

warehouse to automate and improve the regular data analytics, while the needs for an additional data lake solution could be analysed in the future.

### *A separate data warehouse would maintain the benefits to the operational system*

Considering the volume of BURVIS database, SEA should adopt a separate data warehouse for analytical purposes. Adopting a data warehouse solution facilitates data analytics and producing statistics, as well as maintains the same benefits to the operational system as the current solution of having a back-up copy for data analytics.

Similarly to having a separate copy of the BURVIS database, a data warehouse would technically de-couple the operational and analytical databases. This means that neither of the databases can affect the performance of the other due to service interruptions or update installations on systems or underlying hosting layer. When the analytical and operational databases are separated, both can be updated and maintained without affecting the other one, giving much more freedom for the required maintenance tasks. In addition, a complete de-coupling ensures that the performance of the operational system would not be affected by an abnormally high load on analytics database, for example due to end-of-month or end-of-year reporting needs (and vice versa). This is currently achieved at the SEA by having the analytical database to be a copy of the operational database on a separate server, and these benefits would remain when adopting a data warehouse solution.

Even when the SEA would build a data warehouse, the current BURVIS database copy could have the purpose of testing the database backup. In case loading the copy of the BURVIS production database fails, it would signal that disaster recovery would also be endangered. Such testing is often overlooked in many IT systems, as backups are simply taken and archived but not thoroughly tested on a regular basis to make sure these processes actually work. In addition, the current BURVIS database copy can be used to cater for some simple reporting needs within the BURVIS application also in the future, and to cater for reporting needs while a data warehouse is being developed.

### *A data warehouse would enable to better meet the data protection needs*

As analysts and statisticians should generally not process personally identifiable data. A data warehouse could potentially contain only anonymised or pseudonymised data, and thus help the SEA better comply with data protection regulation, such as the GDPR, when processing data.

Anonymisation / pseudonymisation for data analytics could take please in the ETL/ELT phase (Extract-Transform-Load / Extract-Load-Transform). ETL is the more common approach to move data to a data warehouse and, in this case, data are extracted from the source (e.g. an operational database), then transformed while being moved, i.e. before loading the data to the data warehouse. ELT is a newer approach, in which data are extracted from the source system, loaded to the data warehouse, and transformed only later. A data transformation could be automated after loading in ELT (in a separate data staging area in the data warehouse), or even only when data are queried. ELT can be more efficient than ETL, particularly for larger data volumes, but can be more complex to set up and maintain.

### *A data warehouse enables to implement a data model meeting the data analytics needs*

With a fully separate data warehouse and ETL/ELT process, data models in the operational database and in the data warehouse can be better designed to serve specific purposes. When the analytical needs are being catered to using the data directly from the operational database, the data model is not likely fully suitable for analytical needs and the analytics side has to accept some compromises on the data model it works on.

The data structure and content in the data warehouse does not need to follow exactly the same administrative logic as in the operational database. For example, the operational database might need to

include information on the date of application from the jobseeker to be registered as unemployed, the date of the decision by the SEA regarding the application, the content of the decision (e.g. to grant the unemployment status or not), as well as all other administrative dates and actions related to this application and decision (e.g. cancellations, revokes etc). On the analytics side, potentially only the valid date of the start of registered unemployment regarding this application might be relevant. Similarly, other data relevant for administrative processes might not be relevant for analytics, or can be simplified or aggregated. Often, some of the more commonly needed variables are pre-calculated in the data warehouse to enable shorter query times, while the same variables are not relevant for the operational needs and should not be stored in the operational database.

In addition, other data transformation processes might be relevant to prepare operational data fit for data analytics in the data warehouse, such as:

- Quality control;
- Classifying (in case data are not classified correctly);
- Coding (in case data stored in a long text format);
- Cleaning;
- Processing duplicates;
- Transforming into suitable formats for analytical and statistical purposes;
- Imputing missing values;
- Linking the data from different sources (see next Subsection).

### *A data warehouse enables linking data from different sources*

Contrary to using an operational database or its copy for data analytics, a data warehouse solution enables bringing in additional data sources, including additional metadata and pre-calculated aggregate data. Thus, the data readily available for statistics and analysis are richer, extending the scope of knowledge that can be generated using the data warehouse, and facilitating the production of statistics using (linked) data.

To make additional data available in the data warehouse, separate ETL/ELT processes can be set up for this purpose. The modern ETL/ELT tools enable extracting data from different types of data sources, such as data stored in (Excel) files, (operational) databases or the web. Also, APIs can be implemented to obtain external data, for example metadata directly for the data warehouse. Furthermore, additional datasets can be either linked and stored together with the main (BURVIS) data or kept in a separate dataset within the data warehouse, and only linked in a background process when a relevant query is launched. These design choices can have different outcomes in terms of ease of implementation, speed, efficiency and compliance with data protection legislation, and should be thus decided case by case.

### *A data warehouse offers a channel to share data with external partners*

A central data warehouse can contain many different data marts to serve specific purposes, typically focused on a particular subject and thus containing only limited essential data. A data mart could include only statistical information on the subject if this would serve the purpose. Thus, it is possible to share specific data marts to make some data securely available to specific user groups, partners or other external stakeholders, without a possibility of leaking data not meant to be shared. Publishing specific data marts is a secure approach, because even in case a data mart is breached it would not contain any other information, and thus the scope of a potential breach is limited.

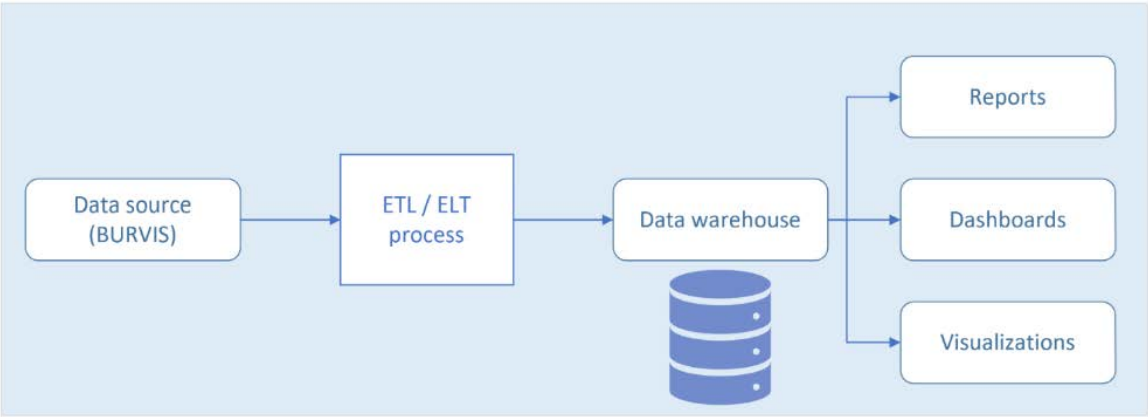
The solution to share data with third parties should be designed together with the overall design of the data warehouse. Designing the data sharing approach early on helps avoid the solution evolving over time ad hoc to a complex and chaotic set of methods that will be difficult to maintain.

When sharing data marts with third parties, an API approach is preferable over direct access to the database as it allows for a better access control. APIs including web service technology is a common and standardised way to share data, which has also functionalities to transform data, as well as to share metadata. Using web services, the system owners can define and implement what data to share and how fast these can be accessed. Web services can use alternative secure authentication methods and support logging functionality, and thus allow the data owner to monitor the users' activity even by each individual user (which users use which data, etc.). However, not all users and third parties will be able to use an API, and hence database access or even secure file uploads may be needed in some cases. Nevertheless, these options should be avoided whenever possible. In addition to lower access control, secure file sharing lacks possibilities to monitor the use of the files and data.

*The architecture of a data warehouse can be developed further as new needs arise*

The architecture of a data warehouse could be arranged in many different ways. Thus, the design of the architecture should take into account all relevant needs, while being as simple as feasible (Figure 6.4). The architecture of a data warehouse can be usually easily expanded when new needs arise. For example, new metadata storage or new data marts can be easily added to the architecture, provided the data warehouse is designed with as little constraints as possible.

### Figure 6.4. A potential architecture of the first version of a data warehouse in the SEA

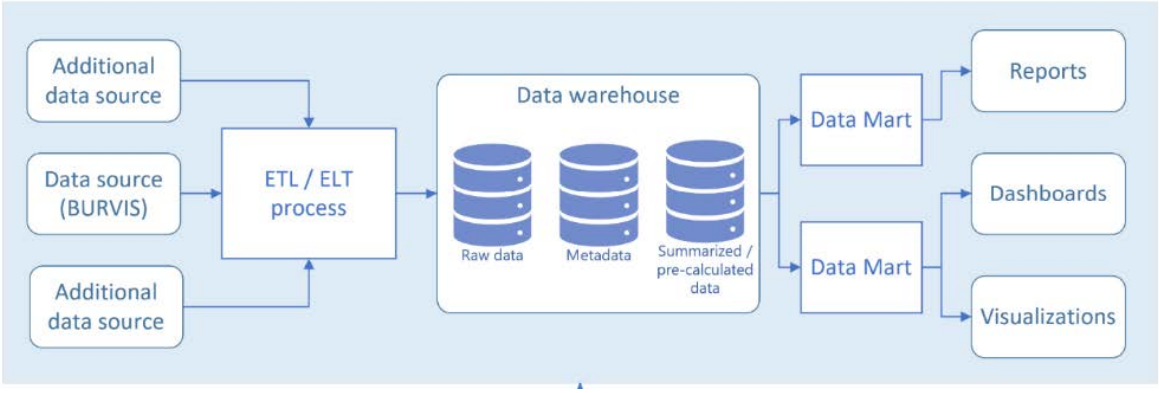



Note: ETL/ELT phase – Extract-Transform-Load / Extract-Load-Transform.
Source: Author's work.

The simplest architecture of a data warehouse could be simply a separate database that is created through an ETL/ELT process. Such an architecture would already allow the data to be shaped to be more suitable for analytical and statistics purposes, and it would not get overwritten by a database copy.

The simple architecture of a data warehouse can be easily extended to cater for more complex needs, such as to contain multiple sources of data, additional metadata and aggregate data, and even data marts, without breaking the fundamental architectural approach (Figure 6.5).

**Figure 6.5. The SEA data warehouse could be developed to cover different data sources in the future**




Note: ETL/ELT phase – Extract-Transform-Load / Extract-Load-Transform.
Source: Author's work.

The SEA could investigate whether it could be sensible and feasible to build in the public cloud. The cloud offers scalability in a way that self-hosted environments cannot easily do. However, the public cloud solution can be more expensive if the usage of the data warehouse is constant.

### *6.7.2. Automating data analytics using Business Intelligence tools*

Business Intelligence (BI) tools facilitate data analytics and generating knowledge, supporting thus the production of statistics and reports, performance management, monitoring and evaluation frameworks, knowledge-based decision making for operative and strategic management and any other data analytics-driven function in an organisation. BI tools enable to quickly analyse and visualise large volumes of structured and sometimes unstructured data for a quantitatively assess performance and identify trends.

PES systems in 76% of OECD and EU countries have adopted BI tools to produce statistics, analyses and support data analytics more generally (OECD questionnaire on digitalisation in Public Employment Services to support the provision of active labour market policies launched in March 2023; the share of countries calculated based on those countries that responded to the question). Many different BI tools available on the market have been adopted by PES across OECD and EU countries, such as Tableau, Qlik Sense, Microsoft Power BI, Oracle Business Intelligence, SAP BusinessObjects, IBM Cognos Analytics and MicroStrategy. Nevertheless, some of the PES have developed their data analytics already some time ago and the solutions are outdated for current needs, some have not yet implemented visualisation or otherwise not harnessed the full potential that BI solutions can offer. Thus, continuous effort to improve data analytics systems is on-going in many PES.

*Business Intelligence tools can support any data analytics-driven function in the SEA*

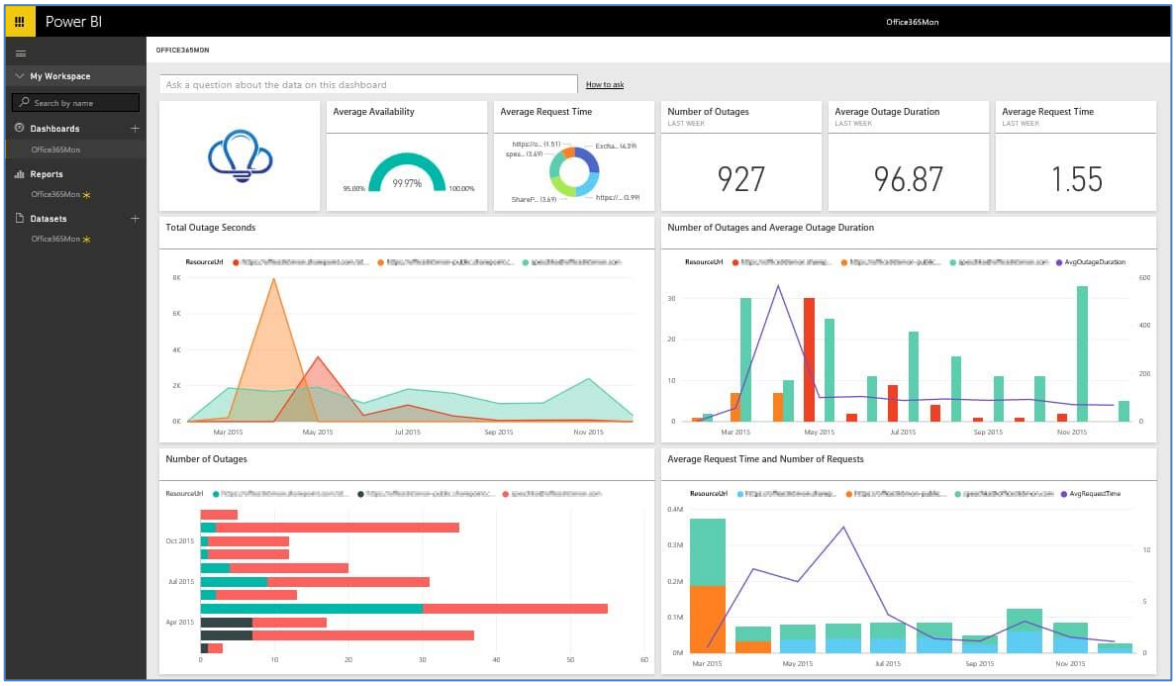
BI tools would enable the SEA statistics department to automate the production and visualisation of all regular statistics, and implement ad hoc queries flexibly. These tools enable setting up pre-defined queries that can produce aggregate or individual level results, with the help of a developer. In addition, the SEA statisticians can define new queries themselves flexibly based on the variables made available via the BI tool without needing to use SQL.

In addition, other units in the SEA like the management and regional offices could have key information automatically available for them within a BI tool in an easily understandable and flexible format that can be used without having data analytics skills, i.e. dashboards. Dashboards offer an interactive visual

representation of key data that can be tailored to the user (Figure 6.6). A user of the BI tool can access several dashboards to cover various needs, potentially with a “drill down” functionality to gain further insights on specific indicator by clicking on it. Via visualisation, dashboards enable to quickly identify trends, rankings, outliers or other anomalies in data and take action.

## Figure 6.6. A dashboard in the Business Intelligence tool can cover key indicators relevant for the specific user

An example of a dashboard in Microsoft Power BI




Source: Author’s work.

BI tools also support producing automatic reports that can combine tables, figures and text into a single document, for example for monthly or annual reporting. Contrary to dashboards, such reports are generally not interactive to enable sharing and printing these externally from the BI tool environment.

### *Adopting a modern BI technology offers many benefits*

BI technology has developed significantly over the past years to enable automatising any routine data processing. Modern BI tools have many advantages over any older tools serving similar purposes:

1. Modern BI tools allow using data from different sources simultaneously, including the data warehouse, databases of classifications and code lists, as well as directly from the operational database.
2. The newer solutions allow automated visualisation of data, including on geographical maps, thus allowing spatial data analyses. In most cases, there is no need to use Geographic Information System (GIS) servers to visualise such maps, which makes these solutions cost-effective and reduces the number of tools needed to produce the outcomes.
3. The newer BI tools have in-memory calculation capabilities making them much more efficient (the user gets the query results much faster). This minimises the need to optimise SQL queries, thus reducing the need for database developers.

4. BI tools enable to authorise/restrict access to specific datasets and reports by user groups as well as by specific users. In addition, it is possible to manage user rights by which actions they are allowed to take (such as only to see built-in reports and queries, or also build reports and queries and build data cubes). This means that the same tool can be used also beyond the statistics department in the SEA, such as the SEA management, regional offices or even external users.
5. The modern BI tools enable also to apply data protection better. The user access to data can be restricted to anonymised data only, even in case the underlying query uses personal data. Furthermore, the query could for example allow only displaying aggregate results of otherwise sensitive micro data. Also, a query can link personal data from different data sources using personal identification codes, but display data for the user as anonymised data or as aggregate data.

All commonly used modern BI tools like Tableau, Qlik Sense or Microsoft Power BI have similar relevant functionalities, such as data visualisation, dashboards and AI assisted analytics, and are thus likely to meet the SEA's needs. Nevertheless, the SEA should map its needs for a data analytics tool and compare these with what the tools offered on the market could support. In addition, technical suitability should be taken into account when choosing an appropriate BI tool, although this is not likely to be an issue considering that BURVIS database is based on PostgreSQL, which is supported by all mainstream BI tools. Operating costs are another factor when choosing a tool but should not be the driving one – a tool that is cheaper to run is a waste of money if it does not meet the SEA's needs and requirements.

### *A Business Intelligence tool can be the technical solution to publish data and statistics*

In addition to meeting the SEA's internal needs to facilitate data analytics, a BI tool could be used to disseminate data and statistics in a user-friendly and flexible way. Adopting a modern tool to disseminate statistics, preferably the same solution as for in-house data analytics, helps the SEA in:

- Consolidating the statistical outputs and channels into one solution.
- Increasing user-friendliness of the format used for disseminating statistics.
- Incorporating dynamic statistical tables (solutions ensuring flexibility and user-friendliness for the external user of statistics). The user could customise the tables, export data (Excel, CSV, XML, etc.), draw charts, save, and manage personal queries (save favourite customised queries).
- Enabling disseminating metadata simultaneously with the data.
- Enabling incorporating an easy application for quickly finding, comparing and sharing data through charts, maps, tables and related publications. This enables users to get a fast overview of more crucial indicators, as well as supports well users with lower analytical skills through easy and user-friendly visualisation. This can support for example higher level policy makers who have only limited time to find the most relevant facts.
- Enabling developing application programming interfaces (APIs) that provide access to datasets in the catalogue of the SEA's public datasets. The APIs (available in different machine-readable formats, such as JSON and XML formats) could allow the user to query the data in several ways, using parameters to specify their request so that they can create innovative software applications which use the SEA's datasets.
- Enabling providing some of the SEA's datasets as open data (pending on content of the data, i.e. the statistics unit and the data protection experts need to discuss and identify which parts of the datasets could be published as open data).

*A Business Intelligence tool could be linked to the copy of the operational database for some preliminary feasibility testing*

A BI tool can use data from different data sources, such as operational databases, data warehouses and publicly disseminated datasets in the web, and do that even simultaneously. For the SEA, the key data would need to come from the BURVIS database, whether directly from the operational database, its copy or a data warehouse that contains BURVIS data. Although these different options would be technically possible, a solution where a BI tool is connected to a data warehouse that contains BURVIS data is strongly recommended due to the different benefits that a data warehouse offers as explained in Section 6.7.1. In addition to the key benefits of not affecting the performance of the operating system and having data fit for analytical needs, a BI tool connected to a data warehouse means that less or even no adjustments are needed within the BI tool when changes are implemented in the BURVIS operational database. If a BI tool would be connected directly to the operational database and something needs to be changed in the operational system, queries and dashboards can stop functioning or produce wrong results, and additional work will be required to fix them.

However, the SEA can connect its BI tool directly to the operational database or its copy in the very initial stages of adopting such a tool. In this way, the SEA can quickly set up some first key queries and dashboards with minimal investments, the data would be up-to-date, and the SEA would quickly acquire some knowledge and skills on fully developing its data analytics system. Nevertheless, the SEA needs to simultaneously start setting up a data warehouse, to gradually avoid dependency between the operational system and the BI system, improve the performance and usefulness of the BI tool, and increase the feasibility to link additional (external) data with BURVIS data for analytical purposes.

## 6.8. Jobseeker profiling tool

Jobseeker profiling tools can be used to place clients into different service streams or flag key obstacles to employment. The SEA currently employs a basic profiling tool to categorise jobseekers into three groups, based on their proximity to the labour market. This tool, however, merely counts the number of risk factors each individual has, such as age, employment history, and care responsibilities, rather than using more sophisticated methods such as regression analysis or machine learning adopted by some OECD or EU Member States. Additionally, the SEA's profiling process is manual and lacks IT support. Data from the SEA's databases and external sources are not automatically integrated into the profiling, requiring manual collection and processing by counsellors.

The profiling tool's categorisation of jobseekers into three "employability" risk groups has shown some success in aligning with the intended risk groups (as shown in Chapter 5). The profiling scores very broadly correspond with the relative risks of participants remaining in unemployment, with half of participants classified in each of the three groups (from most to least job-ready) exiting unemployment within 6, 8 and 10 months, respectively. In addition, jobseekers in the low employability group tend to participate more in ALMPs designed for those with low employability. This includes a higher likelihood of their involvement in ALMPs that focus on addressing health and integration barriers.

On the other hand, the relatively coarse method of categorising jobseekers used by the SEA's profiling tool, which simply counts risk factors, has considerable scope for refinement. While all profiling tools invariably misclassify some individuals, the rate at which the SEA's current tool does so is arguably quite high: for example, almost three in five (58.7%) jobseekers classified as least job-ready exit unemployment within a year. This lack of accuracy reflects the fact that a relatively simple method of counting risk factors (even with a rudimentary weighting, with risk factors such as having two children counting for double) cannot account for the nuanced and complex factors affecting unemployment duration. More sophisticated approaches, especially those that combine survey-based data with administrative data and employ

statistical or AI-based profiling techniques, can dramatically improve the accuracy of the profiling model's predictions.

The targeting of individuals who receive services from the SEA could be improved (see Chapter 5). Jobseekers with high employability are more likely to participate in ALMPs designed for jobseekers with either low or medium employability.

### *6.8.1. Profiling could be used to help counsellors focus on those clients most in need of support*

One of the key challenges facing the SEA is how to provide timely and necessary support – including counselling or other ALMPs, such as training – for those who would benefit from it the most. Latvia's current strategy of mandating meetings for all jobseekers within the first month of registration may entail a trade-off, with job-ready and motivated individuals receiving counselling that would be better targeted towards less job-ready individuals. Thereafter, meetings are in principle scheduled every one to two months, although for clients such as the long-term unemployed, who are not considered labour market ready (and are referred to municipality services), the interval can be up to six months.

In order to better target support, the profiling tool could be used to identify jobseekers who are likely to quickly become employed and may not require an immediate meeting with counsellors within the first 30 days of becoming unemployed. Analysis of the unemployment registry data for Latvia suggests that sizable shares of jobseekers exit unemployment relatively quickly and that a significant minority of jobseekers have at most one barrier to employment.

A sensible approach for the SEA would be to use the results of the profiling tool to push back the initial counsellor meeting for carefully selected groups of clients. This could include those who are assessed to be likely to exit unemployment quickly, who do not express a desire to meet with an unemployment counsellor, and who do not meet any additional rule-based criteria set by the SEA (for example, all first-time jobseekers could automatically be required to meet with a counsellor at the SEA within the first month of registering). Estimates from the profiling exercise could be used to identify, for example, individuals with at least a 75% probability of exiting unemployment within three months, and then exempt them from having an initial in-person meeting for the first three months. If the date of such a meeting were announced well in advance, this could have the additional effect of stimulating some jobseekers to become employed before the meeting: mandated participation in ALMPs has been shown to have small but statistically-significant effects on the probability of individuals becoming employed through "threat effects" (Filges and Hansen, 2017[12]).

### *6.8.2. In the short term, several changes could be made to the current profiling tool*

Several relatively simple changes could be made to the existing profiling approach in the SEA in the short term. These changes would not require significant investments into the IT infrastructure and may thus be more feasible in the short term compared to the more comprehensive changes suggested in the next section.

The profiling questionnaire should be administered in a way so that detailed data on each of the reported individual-level risk factors from the profiling tool – the inputs to the calculations – can be retained, ideally in the BURVIS database. Currently, only the summary classification of an individual into one of the three main categories from the profiling tool is retained (even this is provided without the date an individual was profiled). This makes it difficult to monitor and evaluate the effectiveness of the profiling tool. Retaining such detailed information could be facilitated by administering the profiling questionnaire via a (secure) online survey (ideally a user interface integrated into the SEA's online tools), with the individual responses shared with the SEA counsellors (ideally via BURVIS). For jobseekers who may have difficulty filling out an online survey themselves – most prominently, those who do not register as unemployed with the SEA

online – the SEA counsellors could input this information at their first in-person meeting. This would be similar to an approach recently trialled in Australia (DEWR, 2021[13]), which was generally found to be more time-efficient and easy to use – although a small minority of jobseekers reported difficulty in completing the questionnaire Box 6.3. Administering the survey online could also be useful for using the profiling results to determine the date of the first meeting with the SEA counsellors (as discussed further below).

### Box 6.2. Australia's online trial of its profiling questionnaire

Australia has been using a statistical profiling model since the early 1990s. The current system, the Job Seeker Classification Instrument (JSCI), has been in place since 1998. The JSCI, which is currently under the responsibility of the Department of Employment and Workplace Relations (DEWR), originally collected data through interviews at the time of a jobseeker's initial income support claim. Those interviews are undertaken by Services Australia (the primary service delivery agency for the Australian Government) or an employment services provider. Any significant changes in a claimant's circumstances necessitate a reassessment of their JSCI score.

In 2018, Australia started a trial to move this data collection online, resulting in the Jobseeker Snapshot (JSS). Fully integrated into DEWR's the Online Employment Services platform since April 2020, the JSS essentially gathers the same information as the earlier interview-based system, albeit with some adjustments in question wording and order to suit the online format, plus additional questions around whether the jobseeker has the appropriate access or ability to self-manage in online services. Those unable to complete the JSS online can still provide information via telephone or in-person interviews.

The JSCI model has undergone re-estimation with each update of the mainstream employment services programme. For instance, it was recalibrated in 2015 with the introduction of Jobactive, which replaced the Job Services Australia program, as noted by the Department of Education, Skills, and Employment in 2021. This ongoing refinement ensures that the model stays relevant and effective in assessing jobseekers' needs, and circumstances and level of labour market advantage.

Sources: DEWR (2021[13]), *Online Job Seeker Classification Instrument Trial Evaluation Report*, www.dewr.gov.au/download/11093/online-job-seeker-classification-instrument-trial-evaluation-report/21320/document/pdf; Langenbucher and Vodopivec (2022[14]), "Paying for results: Contracting out employment services through outcome-based payment schemes in OECD countries", https://doi.org/10.1787/c6392a59-en.

The profiling questionnaire could be revised to incorporate questions that have been scientifically cross-validated via rigorous empirical analyses. The factors currently in the profiling model are important in determining how long an individual may remain unemployed. However, they may also contain important omissions and the relative weighting would ideally be subject to a rigorous process to empirically ascertain their relative importance. Several countries have adopted survey-based profiling questionnaires which could be conceivably applied, with sensible modifications in the case of Latvia. Two of these stand out in terms of the degree to which they have been validated and tweaked (for details on the specific questions, see Annex 6.A):

- "Work Profiler 2.0", a questionnaire with 18 key factors used by the Dutch PES (Wijnhoven et al., 2023[15]). Some of the key dimensions covered in this questionnaire relate to aspects such as age, duration of employment in the last job, views on returning to work, desired profession, household position, duration of unemployment benefits, industry experience, job search behaviour, and self-perceived health (see Annex Box 6.A.1). This is an updated version of a questionnaire which had been previously used by the Dutch PES, "Work Profiler 1.0" that contained 11 factors and which itself had been selected, in multiple steps, from a list of 550 potential factors.

- A questionnaire with roughly 10 questions each for jobseekers and caseworkers used in Denmark (Bodilsen, Albeck Nielsen and Rosholm, 2023[16]). This questionnaire has been shown to be especially accurate at predicting unemployment for the long-term unemployed, although conceivably it could be useful for other target groups as well. Furthermore, it is arguably broadly generalisable to other countries – a subset of the questions have been adopted by several PES offices to profile jobseekers in Sweden.

Implementing a revised questionnaire for profiling jobseekers in Latvia would also require assigning weights to each of the questions to calculate a profiling score. This would ideally be done by piloting the survey with a group of jobseekers, tracking their labour market outcomes over the following year and then developing a suitable set of weights based on these outcomes (using e.g. a logistic regression). A simpler, but less accurate, alternative would be to use the weights calculated in other countries and apply them to Latvia (for example, Wijnhoven et al. (2023[15]) list regression coefficients that could be applied, with some modifications, to the Latvian case). In the longer term, a new statistical profiling tool combining survey and administrative data could be designed and implemented.

In the longer term, the SEA should aim at adopting a more sophisticated profiling tool based on the best practice examples of other OECD countries. Such a tool could be implemented as part of a broader overhaul of the digital counselling tools within the SEA. To facilitate the work of counsellors, it could automatically incorporate information from administrative sources in addition to subjective, survey-based sources. Although a recent study from Denmark (Bodilsen, Albeck Nielsen and Rosholm, 2023[16]) found only marginal gains from adding administrative data into a well-designed questionnaire, using administrative data where possible would make the profiling process more efficient for jobseekers and counsellors. The tool would ideally go beyond merely classifying jobseeker employability – it would provide detailed insights into factors influencing a client's score and suggest specific actions to enhance a client's employability through, for example, participation in training (a topic also discussed in Section 6.9).

Such a profiling tool could adopt one of two broad methodological approaches, either based on traditional statistical techniques or newer ones based on AI. Although AI-based models can offer better accuracy than traditional jobseeker profiling tools, the precise degree to which their predictions are better is an unresolved question subject to ongoing research (Gallagher and Griffin, 2023[17]; Andonovikj et al., 2024[18]; Boškoski et al., 2021[19]; Bodilsen, Albeck Nielsen and Rosholm, 2023[16]). In contrast to most traditional statistical techniques, where the contribution of the tool to explaining an individual's profiling score is relatively straightforward, AI-based models often adopt a more "black box" approach where the underlying reasons for a classification can be more difficult to understand. However, some AI-based approaches can generate decision rules which are more straightforward to understand (Gabrikova, Svabova and Kramarova, 2023[20]) and the contribution of individual factors can still be measured in AI-based approaches (Andonovikj et al., 2024[18]). While the potential for introducing bias in the profiling algorithm is not unique to AI-based approaches, their potential for exacerbating such biases is greater given this greater difficulty in understanding the underlying factors explaining the model: a study of the AI-based tool used in Flanders (Belgium) by Desiere and Struyven (2020[21]) showed that increased accuracy for the entire population of jobseekers came at the cost of increased misclassification of immigrants as more difficult to employ (see Box 6.3 for a description of this tool). Regardless of the approach taken, modelling decisions can have important implications on the assessed importance of different factors used to calculate the profiling score (Bach et al., 2023[22]).

### Box 6.3. VDAB's "Job opportunity" AI-based profiling model

Since October 2018, the PES of Flanders (Belgium), VDAB, has been using its "Job opportunity" AI-based profiling tool to help guide the provision of services to clients. "Job Opportunity" employs a random forest model – a type of machine-learning technique – to predict the likelihood of an individual securing a job within six months. This model utilises data gathered from jobseekers upon their registration with VDAB and the completion of their online profiles. The data inputs into the model include:

- **Demographic information**: This includes residence, age, education, vocational skills and competencies, previous work experiences, and periods of unemployment.
- **Work preferences**: Details such as desired occupation, industry, or location.
- **Behavioural indicators**: These are inferred from the jobseekers' activities on the VDAB's My Career platform, including logins, profile updates, and interactions with job listings.

Both jobseekers and caseworkers can update this information anytime, ensuring the data feeding the prediction model remains current, as the model and profiling scores are updated daily. The model translates its predictions into a colour-coded system to prioritise customer support. Specifically, the following colour categories are generated:

- Red: under 35% probability of finding employment within six months.
- Orange: 35-49.9% probability.
- Yellow: 50-64.9% probability.
- Green: at least 65% probability.
- Black: profiling score cannot be calculated because of lack of data (this may be due to certain exemptions, like being enrolled in a training program, or incomplete online profiles, indicating a need for guidance in profile completion).

In the service line, these colours are used to prioritise interactions with customers, with black and red files being addressed first, followed by orange, and green if remaining capacity. Caseworkers only receive the group classification of a jobseeker, not individual scores, to prevent bias in decision-making. They use this information, along with a phone interview and their professional judgment, to determine the support a jobseeker needs. VDAB has a goal to contact and assess all new jobseekers within six weeks of their registration.

Source: VDAB (2021[23]), AI & Advanced Analytics @ VDAB, https://web-archive.oecd.org/2020-11-24/570855-AI_presentation_VDAB.pdf; in addition to bilateral discussions.

Given these trade-offs involved and taking into account Latvia's specific circumstances, a profiling tool adopting an established statistical technique may be the more sensible approach. The AI-based tools are the subject of considerable ongoing research, including into their potential for introducing bias. Furthermore, many of these more advanced solutions require the capacity to adopt AI solutions and regularly update them based on changing conditions (this may be a particularly important consideration in the case of AI-based models, whose greater accuracy may disproportionally be due to how they incorporate period-specific factors). Such considerations have led the Swedish PES, *Arbetsförmedlingen*, to adopt a new profiling model based on a survival analysis model, an established statistical technique commonly used in the medical sciences (Arbetsförmedlingen, 2023[24]). This new model has relatively high accuracy and was introduced specifically to provide more accurate predictions for individuals at different

points in their unemployment spell (the previous model was used for profiling jobseekers throughout their unemployment spell, even though it was designed specifically to predict unemployment duration only for newly-registered unemployed). The precise choice of model by the SEA in the long-term should also take into account how it would fit in with a broader strategy of jobseekers' customer journey, as well as its adoption of new digital counselling tools.

### *6.8.3. The involvement of the SEA counsellors and the broader public in the process of designing and implementing any new profiling tools should be carefully considered*

Experience of PES in implementing new profiling tools underscores the importance of securing widespread support when such new tools are used to guide decisions on which services are provided to specific clients. The experience of Austria, which piloted a new statistical profiling model in 2019, serves as an instructive example (OECD, 2020[25]). Despite thorough and detailed external communication, a vigorous public debate arose about the ethics of "machine decision making" and data protection. This debate centred on four concerns: First, the apprehension that an automated algorithm, instead of a caseworker through personal consultations, would determine services for jobseekers. Second, the fear of potential discrimination by such statistical profiling, especially against women and individuals with disabilities. Third, concerns that identifying long-term unemployed or those at risk of becoming so could lead to reduced services for them. Fourth, there was criticism regarding the opacity in both the new system's implementation and the profiling tool. These experiences highlight the importance of involving many stakeholders at different stages of the design and implementation process.

## 6.9. Skills profiling tool

As of end of 2023, the SEA is in the process of digitising short questionnaires to get a general understanding of jobseekers' skills and preferences concerning working conditions to support the SEA's job matching and career counselling services. Following this, SEA looks to implement more sophisticated skills profiling tools to support counsellors to better and more quickly understand their clients, and to help jobseekers gain self-knowledge of their skills and interests, as well as explore ideas for occupations they should seek. Furthermore, the skills profiling results are expected to contribute to a better overall profiling of jobseekers' needs for support (Section 6.10). A better skills profiling would be relevant also for people at risk of job loss to target training, as well as for the working-age population more generally to better manage adult learning in co-operation with the Ministry of Education.

To minimise the costs to design and adopt more advanced approaches to skills profiling, it is sensible for Latvia to learn from other countries and organisations about their solutions, and potentially even aim to use one of the available solutions after some adjustments if feasible. The SEA and MoW have already started a dialogue with France and Germany to seek synergies across countries in co-operation with the OECD and DG REFORM in the context of the same project as the current report.

### *6.9.1. Skills profiling tools can serve different purposes*

A range of different approaches exist in other countries concerning profiling jobseekers' skills, reflecting a diverse variety of purposes. Thus, it is crucial to first carefully define the purpose of skills profiling for the SEA and then match the right tool to the right task. While some tools can serve a variety of purposes – with perhaps some primary and other secondary purposes – it is important to identify the main purpose of the tool early in the design process so that the other design choices are made to best serve this purpose.

For example, skills profiling tools can:

- **Provide insights and self-knowledge to jobseekers** on their own skills, interests, and personality. This is done (on the topics assessed) by essentially all skills profiling tools when the results are displayed.
- **Support jobseekers to explore occupations and jobs** that potentially match their skills and interests, as is done with the OECD's Skill Profiling Tool and Germany's *New Plan* (see Box 6.4). Also Austria's *Berufskompass* shows professions that map to jobseeker's interests, provides insight into their personality, and includes career recommendations for the types of occupations ranked as most suitable for them (AMS, 2022[26]). These suggestions come with links allowing the client to read more about each occupation. Links are also provided to all training courses available through the PES. Finally, a feedback box allows the PES to understand what works well and what are the challenges jobseekers have with *Berufskompass*. In 2023, the Austrian PES adopted additionally a more modern AI-based solution *Berufsinfomat* to advise jobseekers in career and training pathways, using information on 2 500 occupations and training courses and chatGPT (AMS, 2023[27]).
- **Match jobseekers to appropriate training,** which may be hosted externally to the tool (e.g. Germany's *New Plan*) or within the online environment of the tool (e.g. *Pix* in France and *Ikanos* in Spain (Basque region), which provide training for digital skills).
- **Support employment counsellors and career counsellors** to provide better job counselling and career management services and refer their clients to appropriate training and education programmes. This could be in a variety of ways including through helping employment counsellors understand their clients or by suggesting suitable occupations, job search strategies, upskilling and reskilling possibilities or vacancies. For example, counsellors in the Slovenian PES (use the EU Skills Profiling Tool for Third Country Nationals in the beginning of the counselling process in order to set employment goals based on the migrant's previous experiences and skills, which are not always linked to the migrant's formal qualifications (European Commission, 2023[28]). This EU tool aims to map and document skills to provide support for further assessment (including career guidance), as well as identifying training needs and suitable employment. It is based on users self-identified skills across a range of domains, including languages, literacy, numeracy, digital skills, professional skills, driving skills, as well as questions about a person's education and training. As the skills are self-assessed, it is not suitable as an authentication or recognition tool.
- **Support PES management and policy makers** by providing an overall picture of the skills of PES clients (i.e. information on skills supply on the labour market), e.g. like OECD's Education and Skills Online (see Section 6.9.3).
- **Accredit jobseekers with a certificate, so they can demonstrate their skills to potential employers** (e.g. on their CVs). Examples of tools with this purpose include specialist tools to assess digital skills, such as *Pix* and *Ikanos*. The Netherlands National Centre for Recognition of Prior Learning (EVC) and the Dutch PES collaborate to match jobs seekers who have undertaken a recognition of prior learning assessment with jobs. Their tool supports an in-depth process lasting three to six months to allow individuals to be recognised for skills they have gained without formal recognition, such as by learning on the job, so that they can demonstrate these skills to future employees (EVC, 2023[29]).
- **As an input into the jobseeker profiling approach**, such as an input into statistical profiling tools that calculate jobseekers' distance to the labour market based on the experiences of similar jobseekers in the past (OECD, forthcoming[4]; Wijnhoven et al., 2023[15]), see also Section 6.10.

Skills profiling tools are of course not the only tools and processes that support these purposes. For example, some tools use past outcomes of similar clients to help search for appropriate ALMPs (particularly training) or job opportunities (e.g. Spain's Send@ tool (OECD, 2022[8]), and also a feature of Germany's *New Plan*) to support career counselling services. Other tools, such as VDAB's Jobnet, use a plethora of information to automatically suggest vacancies to jobseekers (OECD, 2021[30]). Another type of tools profile

not the skills of workers, but the skill demands of employers. For example, the Danish PES uses AI to estimate firms' demand for skills based on online vacancy postings (The Danish Agency for Labour Market and Recruitment, 2021[31]) to guide career counselling services and target training measures. More broadly, Skills Assessment and Anticipation exercises should support career counselling and targeting training measures and need to be implemented complementary to skills profiling tools. For example, the Estonian PES assesses jobseeker skills during the first meeting with the jobseeker, including assessing their digital skills using the International Digital Skills Framework. Referrals to training take into account the skills profiling results, as well as forecasted skill needs from the Skills Assessment and Anticipation exercises, both in terms of short-term (internally conducted Occupational Barometer), and long-term forecasts (an in-depth assessment exercise involving a wide range of stakeholders in Estonia), see OECD (2021[32]; 2021[33]; 2023[34]).

### Box 6.4. Skills profiling to help jobseekers explore occupations and jobs

**The OECD's Skills Profiling Tool**

The purpose of the OECD's Skills Profiling Tool (SPT) is to highlight users' skills, so they can explore suitable occupations (OECD, 2022[35]). The SPT differs from other OECD skills assessment projects in that the SPT focuses on providing advice to individual users, as opposed to OECD initiatives like the Programme for International Student Assessment (PISA) and the Programme for the International Assessment of Adult Competencies (PIAAC) that aim to provide policy makers and others with cross-country information on the skills and competencies of teenagers and adults respectively. Linked to the PIAAC initiative, the Education & Skills Online is another OECD assessment tool designed to provide individual-level results on literacy, numeracy and problem solving in technology-rich environments, that will be further developed into a more modular tool that could be used to profile the skills of jobseekers, people at risk of job loss, as well as adult population more generally (see Section 6.9.3).

Launched in 2022, the SPT aims to capture both hard and soft skills. Hard skills are measured by asking users about their experiences (e.g. with cooking, cleaning, caregiving etc.) and how often they perform certain tasks (e.g. read books, read the news, write code, make charts and tables, etc.). Soft skills are measured by a personality test. A report is then generated with a score in each of seven skill domains: literacy, numeracy, digital skills, customer and personal service, time management, motivation and commitment, and creative thinking. Based on O*NET data (O*NET, 2023[36]) on the skills required in many different occupations (using the International Standard Classification (ISCO) grouping), the tool suggests the occupations that best match the user's needs.

The SPT is available free of charge to anyone interested. It has been piloted in five Latin American countries and some are currently using it for some of their (largely underprivileged) clients.

**"New Plan" – a German PES tool with three pillars: Test, inspire, and search**

*New Plan* is a digital tool of the German PES that helps jobseekers find "their true talents and strengths" and is also useful for career counsellors to understand their clients (European Commission, 2021[37]). The tool consists of three pillars, one of which focuses on the measurement of skills while the other two help jobseekers consider different occupations and trainings. The three pillars are:

- *Test:* Modular tests on different topics and competencies.
- *Inspire:* Makes tailored suggestions for career changes based on a jobseeker's employment history matched to the experiences of others with similar profiles drawing from a database of millions of job-to-job transitions.
- *Search:* Allows jobseekers to search for further training opportunities.

The *Test* pillar features a modular design. Different tests are separated into four categories depending on purpose: development opportunities (looks at suitable professions), further education (assesses suitable training opportunities), activities (assesses quickly attainable alternative occupations), and quick competency checks (assesses selected competencies, a few minutes per competence) (Bundesagentur für Arbeit, 2022[38]).

*New Plan* development began in late 2019 and the first version was made available in December 2020. It is part of Germany's Lifelong Career Guidance initiative and is provided free of charge to all interested and has so far served around 500 000 people. Career counsellors at the PES report it is useful in their work, while the German PES stresses that the tool is designed to supplement the work of counsellors and not replace them.

Source: OECD (2022[35]), *The OECD Skills profiling tool*, http://oecd-skillsprofilingtool.org/home (accessed on 26 February 2023); O*NET (O*NET, 2023[36]), O*NET Online, www.onetonline.org (accessed on 26 February 2023); European Commission (2021[37]), New Plan: A self-assessment tool for orientation and counselling, https://ec.europa.eu/social/BlobServlet?docId=24836&langId=en; Bundesagentur für Arbeit (2022[38]), Möglichkeiten testen [test possibilities], http://web.arbeitsagentur.de/sete/testuebersicht/ (accessed on 26 February 2023).

### *6.9.2. Further design choices need to serve the tools' purpose and its integration into the SEA's processes*

Once the main objective of skills profiling has been decided, SEA needs to define the scope of the profiling, particularly in terms of the types of skills that are relevant to cover in the tool. An advantage of a broad test is that it can potentially be useful for a wide range of jobseekers. An advantage of a narrowly focused test is that while it may not be suitable for many jobseekers it may provide a more accurate in-depth assessment of a particular skill which may be better suited to understanding the level of training that matches a client's needs or for providing accreditation to demonstrate this skill to an employer. As such, some tests developed so far are very broad, measuring a wide range of skills (e.g. Germany's *New Plan* or the OECD's Skill Profiling Tool which look at both hard and soft skills). Other tools focus more narrowly only on certain skills (e.g. *Pix* and *Ikanos,* which focus on digital skills, Box 6.5).

#### Box 6.5. Profiling digital skills

**Pix – French non-profit organisation providing digital skills testing, certification, and training**

*Pix* is a French based non-profit public organisation that provides an online platform to test digital skills (Pix, 2023[39]). The tool allows users to test across five domains (information and data, communication and collaboration, content creation, protection and security, and digital environment) covering 16 skills assessed at six different levels. Tutorials are then provided that help students improve based on their current level. Originally founded in France, Pix has now been used by schools and companies in 30 countries, with 6 million active users and over 2 million certifications taken.

The test includes examples of "real life" situations and goes beyond simple multiple-choice questions. Moreover, as the test is a knowledge-based measure of performance (as opposed to self-described competency level), the tests can be used as a means of certification. Indeed, to help students demonstrate their skills to employers, a certificate is generated upon passing a test that users can place on their CVs (OECD, 2020[40]).

**A number of tools use the EU's DigComp framework to assess digital skills**

In addition to the French example of *Pix*, many other tools have been developed to support the profiling of digital skills. These include the digital skills tests Mydigiskills by the All Digital association (All Digital,

2021[41]), as well as skills tests provided by Europass – the European Union's set of tools to help with CVs, cover letters, and finding jobs. Both Mydigiskills and Europass' digital skills test uses the European Digital Competence Framework for Citizens (DigComp) (European Commission, 2023[42]). This framework encompasses five areas – information and data literacy, communication and collaboration, digital content creation, safety, problem solving. The Europass test includes a mix of self-assessment (where uses rate their own view of their skills) and knowledge-based questions with an objective answer (e.g. true/false and multi-choice questions).

*Ikanos* developed in Spain (Basque region) is another test using the DigComp framework (Ikanos, 2023[43]). However, in addition to hosting a digital skills test, the *Ikanos* platform is notable for providing an entire ecosystem of digital learning. This ecosystem consists of a 5-step-model: "discover" (enables individuals to test their skills), "audit" (presents profiles of these skills), "analyse" (helps set objectives), "guide" (provides a resource catalogue,) "learning" (provides an e-learning environment to improve digital skills), and "evidence" (provides certification in approved testing centres, which can then be used as evidence of skill acquisition to employers).

Source: Pix (2023[39]), Pix, http://pix.fr (accessed on 26 February 2023); OECD (2020[40]), The potential of online learning for adults: Early lessons from the COVID-19 crisis, https://doi.org/10.1787/ee040002-en; All Digital (2021[41]), mydigiskills, http://mydigiskills.eu/ (accessed on 26 February 2023); European Commission (2023[42]), Test your digital skills!, https://europa.eu/europass/digitalskills (accessed on 26 February 2023).

If the accuracy of skills profiling is highly relevant for the objective of the tool (e.g. for certification, accreditation, assigning the right level for a training group), knowledge-based tests could be part of skills profiling. Such tools ask jobseekers questions aiming to test their knowledge, such as via true/false questions, multiple-choice questions, or even simulation of tasks (as is done with *Pix*'s assessment of digital skills).

Self-reported tests are a more subjective measure of skills, where jobseekers self-report their own level of skill. Such tests can be easier to design as the questions can be quite straightforward, but they are not suitable as a means of accreditation, and moreover clients may not always be well placed to understand their own skills or may have a different sense of scale in mind when thinking of different skill levels. In between self-reported and knowledge-based tests, some tools, like the OECD's Skill Profiling Tool, ask users how often they engage in certain tasks, and approximate the skill level based on how frequently a person engages in tasks that require this skill.

As it might be more relevant for the SEA to cover different types of skills in the profiling tool, a more modular approach rather than a single test will be likely more suitable. An advantage of a single test is that it can be useful to all jobseekers and clients are not overwhelmed with the number of choices of test. However, the advantage of a modular test is that clients need to take only some of the tests (not all of them). This can be particularly useful to provide different tests to different jobseekers (e.g. those with backgrounds in different occupations) and then assess the skills relevant to the jobseeker in an in-depth way. A modular approach also means that new modules assessing different skill areas can be added as new features when the skills profiling tool is updated.

Furthermore, the technological solution of a skills profiling tool could further increase user experience. For example, the Flemish PES in Belgium, VDAB, uses an orientation test *Orient 2.0* to help understand the self-described interests of jobseekers and how these interests map to professions (VDAB, 2023[44]). While this test measures jobseekers' interests rather than their skills, it shows how AI can be used to shorten questionnaires and dramatically save time for both clients and counsellors. *Orient 2.0* asks a series of simple questions for self-declared interest (thumbs up or down) in many professions, skills and tasks. Upon completion the results show a list of professions ranked by how well they match client's interests. Previously VDAB used a test with over 100 questions that required manual assessment by its labour

market experts (Radix, 2020[45]). A new test makes use of machine learning and artificial intelligence (AI) to adapt the questions asked of clients based on their previous responses (allowing the average number of questions to fall from 114 to 58 questions) and then automatically compile the results (saving counsellor time). This reduced the time taken to complete the test by nearly 80% from an average of 45 minutes to 10 minutes.

### *6.9.3. Skills and Education Online could be a suitable option for Latvia*

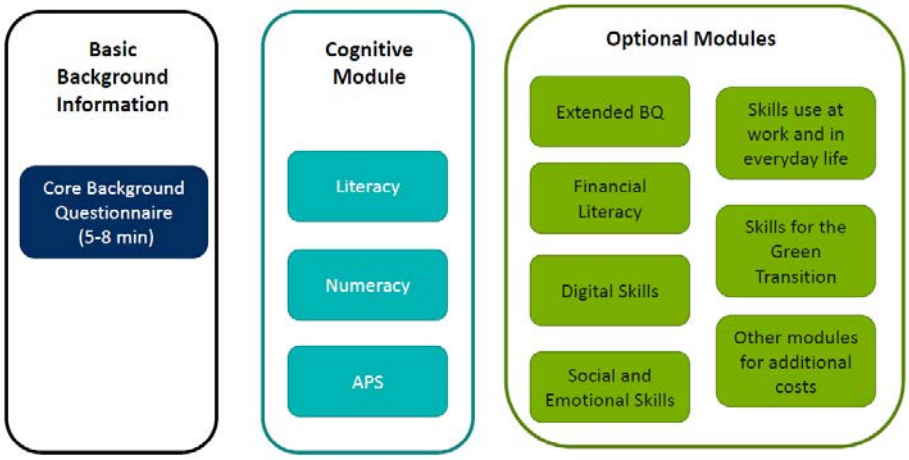
Education and Skills Online (E&S Online) is a web-based tool developed by the OECD to assess adults' cognitive skills, particularly literacy, numeracy and problem solving in technology rich environments (OECD, 2023[46]). E&S Online provides individual-level results that can be benchmarked against the national and international results of PIAAC.

E&S Online can have many different uses cases, such as government organisations aiming to get insights on the skill level and training needs of the workforce or training providers to assess adult numeracy and literacy to better place participants in specific courses and evaluate their progress. Nevertheless, the current design of this assessment tool is quite time-consuming for the participants as the core modules take 65 minutes and need to be completed in one sitting, and the entire test about 120 minutes, with the optional modules having the possibility to be taken at a later point in time. Thus, the present set-up of E&S Online is not very well suited for PES to get quick insights of jobseekers' different relevant skills to provide them job search and career management services and refer them to appropriate reskilling and upskilling options (OECD, 2019[47]).

To meet the increased and diversified needs of labour and education authorities and related stakeholders across the OECD countries to profile and assess adult skills, the OECD is aiming to redesign E&S Online. The redesigned assessment tool will be made more flexible to tailor it to the objectives of the organisations benefitting from the tool. Different versions of the tool will cater to different purposes from providing quick assessments for individuals to reporting representative statistical overviews of a population to organisations. The more modular design will aim to enhance user experience and value-added, as well as enable covering additional skill sets relevant for the different labour markets (Figure 6.7). This may include adding optional modules on skill use at work, digital skills, and financial literacy amongst others. Further adjustments involve for example the funding model and security set-ups to increase the availability of the tool across countries. The launch of the adjusted version of E&S Online is planned to take place by the end of 2025.

### Figure 6.7. A more modular approach of Education and Skills Online will increase the user friendliness and flexibility for both institutional and individual users

Future modules of the revamped E&S Online




Notes: BQ – Background questionnaire.
Source: OECD (2023[48]) "A Personalised Skills Assessment Tool: Education and Skills Online Version 2." Information webinar on 14 December 2023."

Adopting E&S Online would be a viable option for Latvia to be able to profile the skills of jobseekers, people at risk of job loss and the adult population more generally. The adjusted set-up will be more feasibly integrated to the SEA's processes to understand their clients' needs for support, and the additional modules will be likely able to cover the key skills needed on the Latvian labour market (e.g. digital skills). Furthermore, the modernised E&S Online tool that will be better aligned with the innovations introduced recently in PIACC, has the potential to become a recognised international standard to profile adult skills, thus enabling Latvia to better compare itself with other countries. In addition, adopting E&S Online would not require an in-depth knowledge in the SEA on designing the technology nor the content of the tests for skill assessments, thus eliminating such potential barriers that could arise in case of in-house development. Nevertheless, adopting E&S Online in Latvia will need some financial resources from Latvia to contribute to the development and maintenance costs together with other participating countries. The development of optional modules, such as digital skills, will incur further costs.

## 6.10. Job matching tool

The SEA considers job mediation and matching services rightfully to be some of its key responsibilities, and has developed dedicated digital solutions for these purposes. The SEA counsellors access functionalities to match jobseekers and vacancies within the BURVIS interfaces, thus being able to recommend vacancies to apply to during the jobseeker counselling sessions, as well as recommending suitable candidates for employers. In addition, jobseekers and employers can use digital matching services independently in the SEA's CV and vacancy matching portal (CVVP). Although the matching algorithm used in the SEA's digital infrastructure is transparent and straightforward for the different user groups and thus caters to their needs, further improvements in these digital solutions could lead to better possibilities to match labour supply and demand in Latvia.

### *6.10.1. Job mediation and matching services are key for PES*

Mediating jobs and matching jobseekers and vacancies are some of the core tasks of PES across OECD countries, aiming at facilitating labour market functioning and reducing frictions. Job mediation and matching services in PES have a clear dual objective of supporting both jobseekers and employers

simultaneously. In addition to contributing to a better alignment between labour supply and demand and thus decreasing mismatches, job matching services can decrease job search duration and costs for jobseekers simultaneously with reducing vacancy durations and costs to search for employees on the side of employers, hence potentially even encouraging job creation (Pissarides, 2000[49]; Kircher, 2020[50]).

As job mediation and matching services are central, PES across OECD and EU countries have developed digital support for such services (OECD questionnaire on digitalisation in Public Employment Services to support the provision of active labour market policies launched in March 2023; the share of countries calculated based on those countries that responded to the question). Nevertheless, the level of availability, effectiveness, sophistication and user experience of such digital solutions varies significantly across countries. For example, the Romanian PES enables employers to publish their vacancies on a dedicated website, but the platform does not enable to match vacancies and jobseekers or even filter the vacancies by different criteria other than job location. The criteria to filter matching vacancies is also for instance very limited for jobseekers in Greece and Hungary. Furthermore, the full details on the vacancies have been so far available for the jobseekers in Greece only when visiting a local employment office due to the concern of digital tools replacing the need for counsellors – the situation is, however, likely to change in the near future due to a major on-going reform in the Greek PES advancing both the digital backbone and the work processes (OECD, 2024[51]). At the other end of the spectrum are PES that have already a long experience in continuously improving their digital infrastructure to support job mediation and matching services, offering advanced digital solutions for the PES staff, jobseekers and employers (e.g. Belgium (Flanders), Estonia, France, Korea, the Netherlands).

In total, digital solutions to enable jobseekers to independently search for matching vacancies are available in 93% of OECD and EU countries, digital solutions to enable employers to independently search for staff in 88% of countries, and digital solutions to enable PES counsellors to match jobseekers and employers (and consequently support either of the labour market stakeholders) in 80% of countries. Enabling employers to directly contact jobseekers is less often implemented than the other way around due to more complications in making personal data available rather than employer data (i.e. explicit consent form jobseekers is needed), as well as the more traditional approach of jobseekers having to apply for the vacancies. Some countries have opted for having digital matching services available for jobseekers and/or employers rather than PES counsellors, because employment services are largely contracted out (e.g. Australia), job mediation services are the responsibilities of sub-national authorities (e.g. Spain), or the PES operating model assumes that the labour market partners have self-efficacy to use digital tools independently, enabling employment counsellors to focus on other tasks (e.g. Sweden).

Regardless of the exact institutional set-up and operating model of the PES, digital job mediation and matching services can contribute to more effective and efficient service delivery. For example, the online platform *Job Market* in Finland (Box 6.6) has been evaluated to increase efficiency of matching services, i.e. shorter vacancy durations and higher mediated vacancy numbers (Räisänen, 2023[52]; Räisänen, 2022[53]). Other job matching platforms and related digital tools have been evaluated for example to increase firm hiring rates (Horton, 2017[54]), improve job search strategies and increase the number of job interviews for jobseekers (Belot, Kircher and Muller, 2022[55]), and increase job finding rates (Barbanchon, Hensvik and Rathelot, 2023[56]; Behaghel et al., 2022[57]). Nevertheless, the emergence and magnitude of positive effects, as well as the possibility for negative effects (e.g. distorting competition for certain types of vacancies (Altmann et al., 2022[58])) depends on the design and implementation of the digital job matching tool. More tailored vacancy recommendations for jobseekers could minimise potential negative spillover effects (Barbanchon, Hensvik and Rathelot, 2023[56]) and a job matching algorithm that takes jobseeker preferences and labour market situation more into account can increase the positive effects (Alfonso-Naya et al., 2021[59]).

### Box 6.6. Finland's job matching tool uses AI to automatically identify and code skills

Finland's public employment service (PES) maintains a database of about 224 000 jobseeker profiles, about 10% (24 000) of which are active, alongside around 20 000 job vacancies. To support matching vacancies to jobseekers, Finland's PES uses a sophisticated job matching tool, *Job Market*, which incorporates the use of artificial intelligence (AI).

AI is used in several ways within the tool, aiming to improve useability and attach skills to jobseeker profiles, employer vacancies, and training courses, which can later be used to match jobseekers with vacancies as well as training. The AI-based algorithm allows for comprehensive identification of skills regardless of how they are worded or indeed the language they are written in with the tool compatible with Finnish, Swedish, and English. By allowing jobseekers and vacancies to be searched for and matched on the basis of skills rather than occupation alone the tool promotes occupational mobility.

To support linking jobseeker's profiles to skills an AI system analyses a user's profile and then a "competency recommender" suggests to them skills and occupations, which the user can then confirm. These skills are coded using the European Skills, Competencies, Qualifications, and Occupations (ESCO) classification. This process is easier for users than scrolling through the thousands of skills in ESCO. A similar AI process takes the text from a job description (so-called "free-text") and codes the skills associated with this text. Likewise, this is done for the descriptions of training and education opportunities available for jobseekers. A key difficulty is identifying the relevant parts of a job description. For example, a job description may include a generic description of the company or details on the application process, neither of which is relevant text in determining the skills of a job. Different AI (e.g. machine learning and natural language processing) models are used to identify relevant text. Other algorithms help to code some skills as "required" and others as "optional" (especially relating to language skills).

A key part of the tool's natural language processing capabilities involves using an externally trained Large Language Model (LLM) to process text. LLM's have made rapid progress in recent years and many different models are available. The LLM is then adapted to the matching tool's use case through a process known as "fine-tuning", where the model is trained on PES specific text. Data are also used on each ESCO skill description available in the substantive ESCO metadata. Such models can then compare the metadata descriptions of a skill with the jobseeker profile, or job vacancy, to understand if the skill is present in the job description.

Evaluating the effects of *Job Market* is difficult, partly because the technology is available to all jobseekers and employers (so there is no obvious control group) and because other interventions have been rolled out at similar times, such as the *Nordic Employment Service Model* in 2022, that may affect matching. Due to these constrains an evaluation of *Job Market* noted its findings were inconclusive but suggestive of a relatively modest effect on improving matching efficiency (Räisänen, 2023[52]).

Source: Hirsimäki (2023[60]), A platform for job matching using AI: Job Market Finland, Digital tools for matching jobseekers and vacancies: international workshop, www.oecd.org/els/emp/presentation_job_matching_Finland.pdf; Räisänen (2023[52]), How to approach the ex ante employment effects of the Job Market matching platform?, www.oecd.org/els/emp/Session3_Job_Market_Matching_Platform.pdf.

### *6.10.2. The SEA could improve its job matching tool by strengthening competency-based matching*

The SEA's rules-based job matching algorithm in CVVP and BURVIS uses simple and straightforward filters to allow jobseekers, employers and counsellors to match jobseekers and vacancies. The main filters focus on occupations (desired occupations, experience in occupations), geographic location, working conditions (wage, full time/part time), and a few hard skills (driving licences, language skills and digital skills). In addition, the SEA introduced the European Union's employment, skills, competences, qualifications and occupations (ESCO) taxonomy in 2021 regarding both the vacancies and jobseeker CVs. Nevertheless, as ESCO classification is extensive and detailed and thus complex for jobseekers and employers to use, job matching has remained to use only limited occupations, skills and qualifications.

Strengthening the component of competencies and skills in the SEA's matching algorithm could improve the performance of the job matching tool. Focusing on competencies rather than occupations would enable jobseekers to identify matching jobs that otherwise they would have not thought to be qualified for, as well as employers to discover a larger pool of suitable staff. Focusing on competencies is particularly important in the context of changing labour market structure and needs, for example to identify suitable candidates for bottleneck or new emerging occupations (that lack jobseekers that have previously worked on these occupations), as well as provide alternatives for jobseekers that have previously worked on occupations that are no longer needed on the labour market in as large volumes. Evaluations of related digital tools that make recommendations on alternative occupations considering jobseeker skillsets or focusing on occupations of increasing importance have shown to affect jobseekers' job search behaviour, and lead to more stable employment and higher earnings (Belot, Kircher and Muller, 2022[61]; Altmann et al., 2022[58]; Charleer, Gutiérrez and Verbert, 2019[62]).

Moving towards a more competency-based matching algorithm could be implemented gradually in the SEA. As the first priority, the SEA could introduce those competencies in the job matching tool that are considered to be of key importance on the Latvian labour market. For example, the job matching tool used in the French PES includes three sections regarding skills and competencies: i) automatically proposed skills associated with specific occupations (occupation of the vacancy on the employer side, desired and previous occupations on the jobseeker side) according to the skills taxonomy with the possibility to add additional skills, ii) other hard skills like language skills and driving licences, iii) 16 soft skills that are considered to be the most important for the French labour market (Box 6.7).

#### Box 6.7. France uses competency-based matching to move beyond occupation-based matching

The French public employment service, Pôle Emploi, focuses on competency-based matching to help match jobseekers and employers. This system allows, and indeed encourages, jobseekers to consider switching to different occupations where they have acquired the requisite skills from their previous roles, and for employers to consider workers with experience outside the advertised vacancies' roles.

A key part of the matching system is a skills repository. This is a public database, based on 4 million job vacancies and co-operation with employer organisations. It features 532 detailed descriptions of jobs, listing the skills, knowledge required and working conditions. This database helps to suggest and tag skills based on a worker's or vacancy's occupation.

As in some other countries, such as Finland, Pôle Emploi's tool automatically suggests skills and occupations to jobseekers based on their CVs and other information available in the jobseeker profile. Similar automation helps apply skills to job vacancies. The skills available include not only technical skills but 16 soft skills that can be added to a jobseeker's profile. Jobseekers are then suggested vacancies where they match at least 50% of the vacancy's skills, though they can also choose to search more broadly for vacancies (such as searching by occupation). Likewise, employers can see which

jobseekers have a good match with their advertised vacancies or they can search more broadly for candidates on Pôle Emploi's website, and even choose to receive alerts when new candidates register with the skills they are searching for.

Source: Duretz (2023[63]), Pôle emploi: Competency based job matching, Digital tools for matching jobseekers and vacancies: International workshop, www.oecd.org/els/emp/presentation_job_matching_France.pdf.

As the SEA plans to gradually introduce different skill sets in its skills profiling tools (see Section 6.9), the same competencies could be simultaneously introduced in the matching algorithm. Including accredited skills in the SEA's job matching tool could further increase its performance. Recent evidence indicates that credibly assessing jobseeker skills and competencies and making these assessments available for jobseekers and potential employers can have significant positive effects on jobseekers' job search success both in terms of employment and wage (Carranza et al., 2022[64]). Nevertheless, the SEA should aim to also include those key skills and competencies in its matching algorithm that are not yet implemented in the skills profiling tool or that will not be part of the skills profiling tool due to the nature of the skills, to ensure all relevant competencies would be covered and thus contribute to the overall performance of the tool.

It is important to cover the key competencies and skills in a job matching tool systematically to avoid biased and thus unusable matching results. Although algorithms to map competencies without specific skill taxonomies have been proposed in computer sciences (e.g. Schlippe and Bothmer (2023[65])), competency-based job matching tools in PES aim to ensure systematic approaches by using dedicated skills taxonomies like ESCO, O*NET or ROME (*Répertoire Opérationnel des Métiers et des Emplois*). PES in the EU are increasingly using the ESCO classification as the main skills taxonomy due to the obligation to use this classification also for the job mediation across EU countries (European Employment Services job mediation EURES). As such, the SEA should link the competencies to be introduced in its job matching algorithm to the ESCO taxonomy, including those competencies that are being mapped in the skills profiling tool.

### *6.10.3. User experience and effectiveness of the SEA's job matching tool could be further enhanced by AI*

Similarly to the SEA, other PES have faced difficulties in adopting the ESCO taxonomy within their digital solutions in a user-friendly manner. As the ESCO taxonomy is complex, jobseekers and employers have difficulties in selecting the relevant competencies, leading to errors in the selections or missing the competencies altogether.

To overcome the difficulties in using the ESCO or other similar taxonomies, PES are increasingly harnessing AI algorithms to facilitate users to quickly identify the relevant competencies or even identify the competencies for them. Such an approach can increase user-friendliness of the process to identify skills, as well as ensure a more comprehensive skill detection by supporting jobseekers to identify skills they had not realised they possessed. For example, the Luxembourg PES has developed an algorithm using Natural Language Processing (NLP) to automatically classify vacancies according to the ESCO taxonomy, that is currently applied for statistical purposes, but will be used in job matching algorithms in the future ( (Baer, 2023[66]), Box 6.8). The NLP-based algorithm in the online platform *Job Market* in Finland is already extracting competencies from CVs, job application documents and vacancy texts using the ESCO taxonomy (Job Market Finland, 2023[67]; Hirsimäki, 2023[60]). Also the Israeli PES is using AI in a similar fashion, i.e. to extract competencies according to the ESCO taxonomy using jobseeker CVs as inputs (Brioscu et al., Forthcoming[5]). The Estonian PES is testing how to facilitate using ESCO taxonomy for the job matching tool by harnessing ChatGPT and thus aiming to avoid developing a new NLP-based

algorithm. While the latter approach is not likely to have as high performance and integrated solution as in the aforementioned countries, it can be a lot less costly way to improve the job matching tool.

### Box 6.8. Luxembourg is developing a new matching tool

Luxembourg is in the process of developing a new tool to support the Luxembourg public employment service (PES), ADEM, to match jobseekers with vacancies. Currently, ADEM uses a tool which is only available for counsellors to use and is not available to jobseekers or employers. The current tool is also a simple rules-based tool and does not use any artificial intelligence (AI) or machine learning or support matching of jobseekers to training.

The new tool will offer many improvements. It will be available to both counsellors and jobseekers, which could increase convenience for jobseekers while also potentially saving time for counsellors. In fact, the tool will be available to all jobseekers, not only those that are registered with ADEM, further increasing the tool's value. The tool will offer skill-based matching and make use of AI to help identify and tag the skills of both vacancies and jobseekers and encode these skills to the European Skills, Competencies, Qualifications, and Occupations (ESCO) classification. The AI uses different Natural Language Processing (NLP) approaches to detect skills in vacancies and jobseekers' profiles. In addition to matching jobseekers and vacancies, the tool will also support matching of jobseekers to training that may be beneficial for them.

To support the tool's, development ADEM is leveraging the expertise and experiences of others, noting the importance of working with other countries and outside providers. ADEM is working with the Flanders' PES, VDAB, through the support of the EU PES Network's Mutual Assistance Project, to bring in the perspectives of a PES with an advanced matching tool. To develop the tool, some work is done in-house, with one data scientist working part time on skills encoding. However, Luxembourg will contract out the development of the tool itself to bring in the additionally necessary expertise.

While the new tool is still in the development and planning process, ADEM has already learned many important lessons. They have already made progress with the skills tagging and note that the ESCO resources and metadata (with the detailed descriptions of each skill) have been very helpful. In just a few months they have found that the skills tagged by the algorithm are indeed accurate reflections of job vacancies, although they note that the algorithm does struggle to identify all the skills relevant to a vacancy, and most especially the algorithm misses less technical "generic" skills. To ensure the accuracy of the algorithm, ADEM invests in "in-depth" validation of the results, which ADEM notes is time consuming but crucial.

Source: Baer (2023[66]), Algorithms to facilitate job matching in Luxembourg, Digital tools for matching jobseekers and vacancies: international workshop, https://www.oecd.org/els/emp/presentation_job_matching_Lux.pdf.

AI algorithms can also be used to improve the performance of job matching tools in other ways, such as to improve matching quality. Above all, AI algorithms can better take into account jobseeker interests (including using the information on jobseeker behaviour while using the matching tool, i.e. click data) and the labour market dynamics, make the digital tools more intuitive, and thus make more tailored and personalised recommendations for both jobseekers and employers (Brioscu et al., Forthcoming[5]). As a result, job matching algorithms enhanced by AI can have more positive effects on the labour market (Barbanchon, Hensvik and Rathelot, 2023[56]; Alfonso-Naya et al., 2021[59]). AI has been introduced into the job matching algorithms for example by the PES in Belgium (Flanders, Box 6.9), Canada, Finland, Korea and Mexico.

### Box 6.9. The Flemish public employment service, VDAB, uses several sophisticated tools to support matching

The public employment service of Flanders, VDAB, invests heavily in digitisation, machine learning and artificial intelligence (AI). Indeed, VDAB has an "innovation lab" of 30 people in 2022 including Data Scientists, Data Engineers, Project Managers, Business Solutions Professionals and "DevOps" employees. Such investment has yielded several sophisticated tools to support matching jobseekers with vacancies.

VDAB has developed *Jobbereik* (job reach) and *Talent API* to match jobseekers and vacancies. *Jobbereik* includes a graphical interface to visualise how well the skills of a jobseeker map to specific occupations. The tool is available to both jobseekers and their counsellors. *Talent API* is a job matching tool that recommends vacancies to jobseekers using sophisticated AI that analyses vacancies, jobseeker profiles (location, previous work experience and skills), and even past vacancy-browsing on the website to find the most relevant vacancies for a jobseeker. As described in Section 6.9.2. VDAB also uses another tool, *Orient*, to understand jobseekers' preferences and map these to occupations and corresponding vacancies.

The above-mentioned digital tools for jobseekers and counsellors are in turn supported by background tools that code vacancies and job profiles with occupations and skills in a consistent way. Such tools include the "competency-extractor" to tag competencies from CVs and vacancies and the "occupation finder" to code correctly the occupation of a vacancy. These tools make use of sophisticated classification for skills (The Competent Standards) and occupations (the VDAB Skills framework).

Source: OECD (2021[30]), *New ways to reach out to employers*, http://oecd.org/els/emp/Employers.pdf; VDAB (2021[23]), *AI & Advanced Analytics @ VDAB*, https://web-archive.oecd.org/2020-11-24/570855-AI_presentation_VDAB.pdf; Broecke (2023[68]), Artificial intelligence and labour market matching, https://doi.org/10.1787/2b440821-en; Brioscu, Lauringson, Saint-Martin and Xenogiani (Forthcoming[5]), "New dawn for public employment services: Service delivery in the age of artificial intelligence".

However, introducing AI into matching algorithms means that the design, testing and monitoring of the job matching tool needs to be even more careful and thorough. AI use can further increase risks associated with digital tools in general, such as issues concerning data protection, potential biases and discrimination, trustworthiness, transparency, caseworker oversight and ethicality (OECD, 2022[69]; Allhutter et al., 2020[70]). For example, the PES in Belgium (Flanders) has used an AI-based job matching tool and another job matching tool without the AI components simultaneously, to give jobseekers the opportunity to choose between the enhanced tool and the simpler and transparent tool. Furthermore, the design of job matching tools needs to specifically consider managing the risks of distorting labour market functioning, increasing the competition between jobseekers, and locking certain groups in the society into lower quality jobs (OECD, forthcoming[4]).

Enhancing the SEA's job matching tool with AI technology could address several of the issues associated with the current solution, such as helping to strengthen competency-based matching and fully integrate ESCO taxonomy, perform higher quality and more personalised matches, provide better overview of possible career choices for the jobseekers, as well as make the tool more intuitive and user-friendly. Nevertheless, developing more advanced technologies can be time-consuming and costly, while some advancements in the performance of the job matching tool could be achieved without AI adoption. In the long-run, the SEA should aim at adopting an AI-based job matching tool that uses competencies, jobseeker interests and labour market information to match jobseekers and vacancies, potentially in co-operation with other PES to avoid duplicating efforts and use the resources efficiently. Smaller adaptions to increase the tool performance could be done already in the near future, such as allocating more server capacity to increase the speed of providing matching results, adding key competencies in the matching algorithm,

displaying full matches and near matches for the users in a comprehensible way, as well as enhancing user experience within the tool design more generally.

### *6.10.4. The vacancy posting process could be streamlined and automated*

The SEA already achieves good vacancy coverage indicating no major problems in the share of vacancies collected. Indeed, about 80% of vacancies posted in Latvia are available through the SEA's CVVP platform (see Chapter 4). To increase the number of vacancies to mediate to the jobseekers, some PES (such as in the Netherlands and Austria see Box 4.1 in Chapter 4) collect vacancies using techniques like web scrapping and automatic connections (APIs) to other vacancy databases. The SEA could consider such techniques, particularly APIs and agreements with other large vacancy websites, which are likely easier to implement than web scraping techniques. However, given the SEA already reports large coverage of vacancies, such tools may not be necessary or worth the cost and so are a lower priority than other investments.

Some other improvements to streamline the collection of vacancy postings may, however, be warranted. Notably the uploading of vacancies in the CVVP portal is often a manual process, with many vacancies submitted via e-mail or telephone and then manually added to BURVIS by counsellors. The SEA reports that this is often the preference of employers rather than employers directly submitting them through the CVVP. Indeed, regular contact between counsellors and employers is positive and can help foster good relations, which are crucial for a PES. However, these manual processes naturally take counsellor's time, and such time could be put to other uses (including fostering good relations with employers in other ways). Moreover, some advanced systems in other countries (such as in the French PES) rely on automatic processing and tagging of data as a first step to more sophisticated algorithms.

The SEA should continue to provide manual uploading of vacancies as a valuable service to those employers who need it, but it should seek to better understand why employers are not uploading them through the CVVP themselves. If it is because employers are simply not aware of the online services available for them, they should be informed. Quite possibly it is because the interface is cumbersome, not well understood or otherwise not user friendly for employers. If this is the case, the SEA should identify the design issues and improve the CVVP for employers, so that they find it easier and more helpful to use. This can save employers' and counsellors' time while ensuring a consistent format for data uploading. Such consistent data helps support the matching process and search features within the CVVP and indeed would be helpful if more advanced features (such as automatic skills and competency tagging) was adopted as discussed in Sections 6.10.2 and 6.10.3 above.

## 6.11. Further possibilities to enhance the SEA services to jobseekers, people at risk of job loss and employers via digitalisation

The previous sections of this report focused on the overall digital infrastructure of the SEA and the key PES-specific digital tools – jobseeker profiling, skills profiling and job matching – to advise the SEA in modernising its digital backbone and thus better support the Latvian labour market.

Although not in the centre of attention of this report and a key priority for the SEA, the current chapter and Chapter 4 make a few references to some of the other PES-specific digital solutions that have been developed in other countries. These include for example digital tools for career management, e.g. recommender tools for job search, training options and career pathways going beyond matching the jobseeker with a specific vacancy but rather taking a more holistic approach. Other solutions help with the vacancy pool to mediate for the jobseekers including digital solutions that detect vacancies available in other platforms outside the SEA, as well as identifying employers with a potential for upcoming vacancies (i.e. before the vacancy is even advertised). Another set of digital tools can support employers more

directly, for example by helping to redesign and reconstruct job postings to better identify and attract possible candidates, which can be particularly important for bottleneck occupations. Furthermore, PES in other countries are continuously looking for opportunities to facilitate their work processes and back-office tasks with advanced technologies that are not necessarily PES-specific in nature, such as AI-generated automatic email responses (see more in Brioscu et al. (Forthcoming[5])).

Many of the recent advanced digital solutions to increase PES effectiveness, efficiency and user-friendliness in other countries have required considerable capacity in-house to manage these modernisation projects and resources and skills to develop or outsource these developments. Although the SEA has relatively tight capacity and budget to undertake similar projects, some advancements could be more feasible in co-operation with other PES, taking advantage of the recent fast developments in AI technologies (particularly in Large Language Models and generative AI), as well as for example fine-tuning the user experience in the current solutions and feasible technologies.

In conclusion, the SEA should focus on the recommendations made in the current report as a priority for modernising its digital backbone. The key first steps of the modernisation will be developing a comprehensive digitalisation strategy to establish the objectives and relevant frameworks, implement the more feasible fine-tuning related to the operational IT system, start the development of an advanced data analytics system consisting of a data warehouse and a BI tool, gradually improve the design and implementation of the jobseeker profiling tool, continue co-operating with other organisations to find feasible solutions for skills profiling, and move towards competency-based job matching. Additional improvements and new digital tools learning from the recent good examples of other countries discussed above could be considered for the future and addressed in the digitalisation strategy accordingly.

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# Annex 6.A. Examples of profiling questions

### Annex Box 6.A.1. The new profiling tool used by the Dutch PES included 18 factors

**Questions included in the "Work Profiler 2.0" used by UWV**

1. Age
   - (up to 25 years, 25-40, 40-60, 60+)
2. Years employed in last job
   - 0-0.5 year
   - 0.5-1 year
   - 1-2 years
   - 2-5 years
   - 5-10 years
   - 10-50 years
3. Views on return to work
   - (Eager to return, hesitant, uncertain)
4. Desired profession
   - Economic-administrative (reference category)
   - Agricultural
   - Computer
   - (Para)medical
   - Public order and safety
   - Educational
   - Socio-cultural
   - Technical and industrial
   - Transportation
   - Care and service
5. Position within the household
   - Lives alone (reference category)
   - Married/lives together, no children living under the same roof
   - Male married/lives together, youngest child under the same roof is 0-6 years old
   - Female married/lives together, youngest child under the same roof is 0-6 years old
   - Married/lives together, youngest child under the same roof is ≥ 7 years
   - Single parent
   - Other
6. Maximum duration of unemployment benefits
   - Longer than 12 months: no (reference category)
   - Longer than 12 months: yes
7. Industry prior to unemployment benefit
   - Finance (reference category)
   - Construction

- Health
- Industry
- Agriculture, fishing, food
- Other
- Other companies and other professions
- Transportation
- Employment agencies
- Stores and wholesale

8. Job search behaviour concerning direct contact with potential employers
   - (Regularly contacts employers, seldom contacts employers)
9. Perceived health
   - (Good, fair, poor)
10. Balance of the advantages and disadvantages of not-working
    - As many advantages as disadvantages (reference category)
    - More disadvantages than advantages
    - More advantages than disadvantages
11. WIA 35-min (disability assessment)
    - No
    - Yes
12. Problems understanding Dutch
    - No problems
    - Some problems
    - A lot of problems/does not understand Dutch
13. Readiness to accept a fulltime job
    - (Ready, not ready, conditional)
14. General work ability
    - (High, moderate, low)
15. Number of hours per week capable of work
    - (20 hours, 40 hours, 60 hours)
16. Level of education
    - Low
    - Middle
    - High
17. Readiness to get work with irregular working hours
    - (Willing, unwilling, conditional)
18. Income from work besides the unemployment benefit
    - No
    - Yes

Source: Wijnhoven et al. (2023[15]), The Work Profiler: Revision and maintenance of a profiling tool for the recently unemployed in the Netherlands, https://doi.org/10.1111/issr.12327.

## Annex Box 6.A.2. A Danish profiling tool incorporates questions for both jobseekers and counsellors

**Questions in the Employment Readiness Indicator Questionnaire(ERIQ)**

***Questions to Clients***

1. Are you aware of what type of work you would like to perform?
2. How do you feel about initiating contact with people whom you do not know?
3. How good are you at collaborating with others?
4. Do you have the support of family and friends when you need help?
5. Do you have the personal energy in your everyday life to focus on getting a job?
6. In general, how would you rate your (physical and mental) health in terms of being able to hold a job?
7. Do you think your skills can be used in a workplace?
8. Do you think you are able to carry out work at a workplace?
9. Do you know what to do in order to improve your job opportunities?
10. How do you search for a job?

***Questions to Caseworkers***

1. Does the client have a realistic understanding of where in the labour market, his/her competencies can be applied?
2. To what degree does the client act with determination in terms of obtaining a job?
3. How do you assess the client's ability to seek and initiate dialogue with others?
4. How good is the client in discussing about him/herself and his/her relevant competencies?
5. How do you assess the client's ability to co-operate with others?
6. How do you assess the client's ability to receive and understand instructions about a task?
7. How do you assess the client's ability to concentrate on a task without being distracted?
8. To what extent does the client have a social network that provides support for entering the labour market?
9. To what extent is the client able to master his/her own life at the same time as focusing on obtaining a job?
10. To what extent is the client able to master any (physical and mental) health problems?
11. Do you believe that the client will get a job within the next year?

Source: Bodilsen, Albeck Nielsen and Rosholm (2023[16]), "Measuring employment readiness for hard-to-place individuals," https://doi.org/10.2139/ssrn.4646348.

## Notes

[1] Penetration testing is a process in which a system is hacked on purpose – an actor is attempting to penetrate through the defences of the system. This is often done as automated tasks, complemented with expertise of specialists of the security field. It is used to find potential weaknesses in the application that malicious actors could exploit. If such weaknesses are found in penetration testing, they can be fixed before a malicious actor can break in.

[2] A storage system of programming code that allows for versioning and multiple developers working together on the same code.

[3] For example, a source code pull request can have a gate where the pull request is denied if there are any high impact vulnerabilities found (for example vulnerabilities known to allow attackers access to system data). This means that a developer cannot contribute code that is known to have a high-risk vulnerability but is required to fix the issue, before the code is allowed. Another gate could be release to production, stating, that there cannot be any medium or high impact vulnerabilities. This would prevent a malicious actor that has somehow gained access to source control, from implementing a vulnerability into production.

Connecting People with Jobs

# Modernising Latvia's Public Employment Service through Digitalisation

Latvia's public employment service, the State Employment Agency (SEA), is undertaking a modernisation of its service delivery. This review discusses the SEA's digitalisation needs and strategy to guide its modernisation efforts. It provides a detailed assessment of the SEA's digital infrastructure and key recommendations concerning its IT system, analytical capacity and digital tools for jobseekers and employers. This report on Latvia is the fourteenth country study published in this series.

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