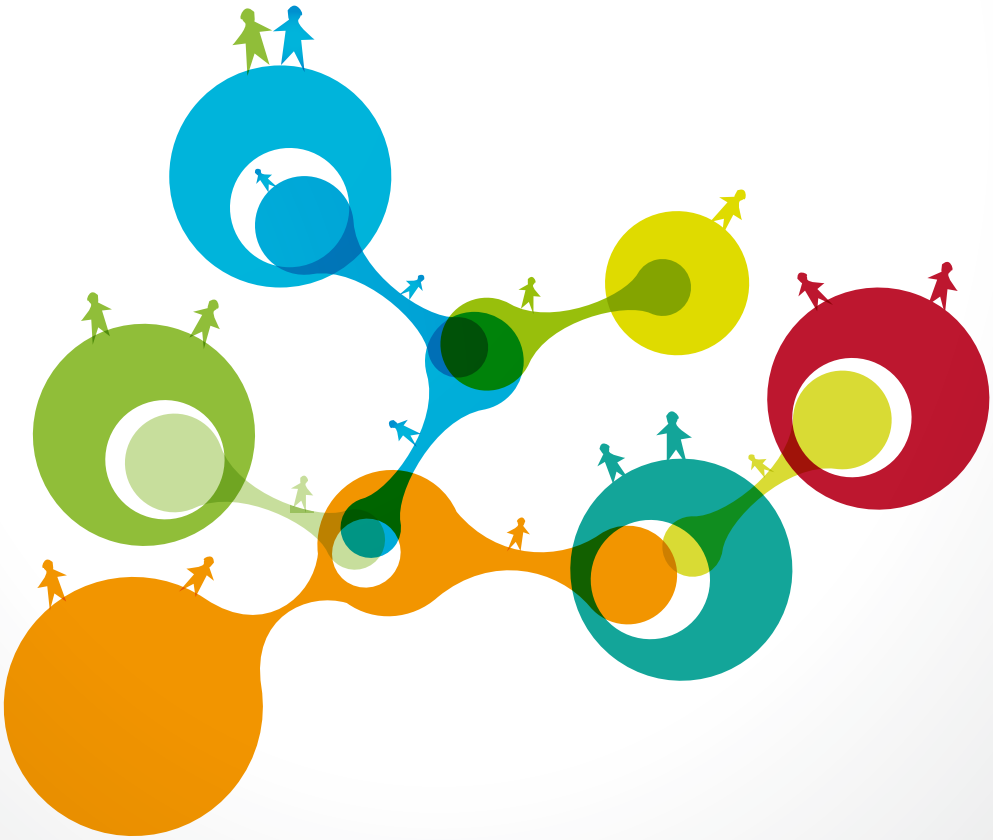
European Commission

SUMMARY REPORT

THE VDAB'S INNOVATION LAB



Employment, Social Affairs and Inclusion

FEBRUARY 2017

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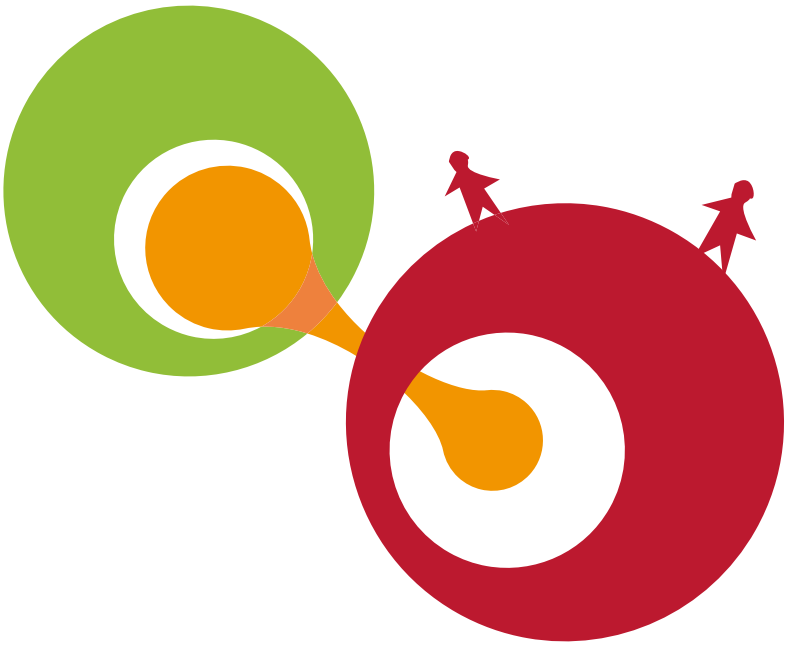
Contents



1. Introduction

A Thematic Review Workshop on 'Modernising PES through supportive data and IT strategies' took place in Zagreb, Croatia, on 6-7 July 2016, which focused on key considerations when developing or reviewing IT strategies and data systems in Public Employment Services (PES). After this workshop, several European PES expressed an interest in meeting again with the Belgian Flemish PES (VDAB), in order to gain practical insight into the organisation's *Innovation Lab*. A Follow-up Visit was therefore organised with VDAB for 22 November 2016. The visit provided an opportunity for visiting PES to hear about:

- How the Lab is resourced, understanding its ethos/approach;
- How the Lab transitions prototypes out of the Lab;
- What products have successfully been launched;
- Areas where the PES looks to innovate further.

PES representatives from ten PES attended this follow-up visit, including Croatia, Denmark, Estonia, France, Hungary, Latvia, Luxembourg, Netherlands, Norway and Sweden. This reports presents the discussions that took place during the visit, focusing on what the ten visiting PES heard on the day and the conclusions that collectively emerged throughout the day.

2. What is the Innovation Lab and where does it come from?

Launched in 2014, the Innovation Lab seeks to harness VDAB's human and digital capabilities to be an innovative conductor in the labour market. It is a key instrument that the organisation created to foster change, looking to move the PES from being a traditional organisation to becoming a **twenty-first century agency**. Eager to remain *useful* to today's society and its needs, the PES wants to provide the best services possible to PES customers, in the most accessible way. It is for these reasons that the VDAB look for radical change in their functioning. Ultimately, the PES wants to move towards flexible and proactive service delivery, including multi-channel communication and promoting self-service and self-management to its customers.

2.1. Setting up the Lab in practice

The Lab was set up to respond to general public sector trends in reducing costs, simplifying processes and participating in the OpenGov initiative. Internally, the Lab sought to convince the rest of the organisation that a wide-reaching innovation programme would make VDAB services more effective and useful for customers and society in general. From the outset, the principles guiding the work of the Lab today have been carefully linked to support the regional strategy, the PES's own customer strategy and the contribution the PES' work makes to the Europe 2020 Strategy.

From a practical point of view, setting up the Lab required funds and relevant support from the VDAB management board. The commitment of decision-makers to sponsor this initiative was crucial for its successful establishment in the PES.

Between 2014 and 2016, the Lab went from set-up through to transformation, becoming an established preliminary stage for idea generation in the PES. The number of staff grew rapidly in that period, going from two people to becoming a team of 15 people (10 staff are dedicated to the lab full-time, five work on specific projects). Staffing and management structures also underwent several changes, starting from a loose structure to firming up a strategic steering committee, through to establishing three formal roles in the Lab:

Developmental stages of staffing and management 2014-2016:

To avoid overlaps, the Lab is set up to work in parallel to the rest of the organisation. New products generated through the Lab deliberately do not focus on substituting core PES services. Rather, the focus is thinking outside of core services, with a view to enhancing what is currently delivered, accessible and used. The Lab generates small-scale projects and products that can be developed and tested independently to the rest of the PES services. Since it was launched, the Lab has developed a total of 13 projects:

- Three are being tested (Recommendations, Next Best Steps, Hi App);
- Seven are in production phase (Smart TV; App My Coach; Webapp Vick; app jobbeurzen; App Mentor; The Datatank; App Vind een job);
- One is being piloted (Watson); and
- Two failed and were cancelled (Otto, Jobadvisor).

2.2. Approach/philosophy

For VDAB, part of the change that needs to take place will come from **'disruptive technology'** and consolidating an **entrepreneurial, start-up mentality** across the PES to generate innovation and improve service delivery. Within this approach, innovation is seen in the following way:

'Innovation is hard to teach because it is inherently messy, unpredictable, and team-oriented. (...) It is necessary to abandon judgement, open oneself to a seemingly endless field of possibilities, and then try those possibilities again and again, iterating and (hopefully) failing enough times to know that you are onto something.' [1]

For VDAB, innovation does not have a plan, nor can that plan be defined in time. For this reason, the Lab follows six strategic principles that drive all its work:

- Moving from digital support to **digital first**. The Lab places 'digital' at the centre of the innovation process instead of using digital technologies simply to support innovative products. Based on this principle, VDAB looks to interconnect their products and services in order to improve service delivery, and customers are encouraged to interact with PES services via digital channels. For this to be a reality, the PES' priorities need to be aligned with the Lab's objective to develop new digital products and introduce new technologies (such as Artificial Intelligence).
- Moving from service provision to **ecosystem**. The concept of an ecosystem refers to the Lab' objective to create the framework and the tools that invite other stakeholders to be involved. VDAB wants to promote an *open* ecosystem through the use of open software and stay flexible to other ways of doing things. With this approach, VDAB seeks to be an impactful actor within a wider network of stakeholders who also play their crucial roles. In that sense, the Lab does not 'own' new products; on the contrary, it promotes other stakeholders making use of innovative products as a way to increase the PES's impact.
- Moving from offering services to taking customers through a **journey**. VDAB seeks to develop a more comprehensive service approach, supporting customers *throughout* their careers (not just at points of unemployment). The Lab is intent on understanding how to best coordinate dynamic service journeys for PES customers (including jobseekers and employers). To that effect, it is crucial for the PES to work with customers in order to understand the journey they go through, and to clarify how the PES can best play its role. The Lab engages in continuous co-creation with the PES's end users, in order to ensure that products respond to customer needs as closely as possible.
- Not *have* to, but **want to**. The Lab is guided by the desire to develop products that are accessible and attractive to PES customers. Hitherto, where a product does not attract a large enough number of users (currently set at 5 000 users by three months), then the product concept is dropped (or reviewed). What people want or need, people will use more freely.
- Moving from plan-driven to being **agile**. The Lab's projects and products emerge in a dynamic environment, which requires people and teams to be agile in how they manage their work. New products have to respond to rapid changes in customers' needs, be inclusive of emerging technologies and satisfy a wide range of stakeholders. In that sense, the Lab has to stay flexible, observe how products evolve and regularly introduce modifications to improve them. This is also why the Innovation Lab team creates regular beta-versions to test their products.

1 Lisa Kay Solomon, Professor of Design Strategy at San Francisco's California College of the Arts. http://www.forbes.com/sites/quora/2014/02/06/why-isnt-innovation-taught-in-the-classroom/#71e61a60298a

- Moving from ad-hoc to working with **real capabilities**. The Lab is organised in a way that promotes effective implementation of services and products, which has required the development of new organisational capabilities. The fact that the PES set up a team *dedicated* to innovation means the PES seeks to enhance these capabilities while promoting organisational stability. Moreover, the internal organisation of the team reflects the work carried out by the Innovation Lab team. In this regard, three specific roles were recently created: Lab Manager, Service Manager and Transformation Manager.

Further discussion points with visiting PES

Visiting PES were particularly interested in discussing the following points:

- How the Lab defines and measures success
- How product 'failure' affects the brand of the Lab internally
- What model for cooperation VDAB applies for/with partners

VDAB clarified that the Lab measures success by how/when/how often a product is successfully taken up and used by PES customers. New products undergo a testing process and feedback is collected in order to improve them. If a product does not attract a large enough number of users (currently set at 5 000 users by three months), then the product concept is dropped (or reviewed).

The guiding principles of the Lab assume that not all products which are developed will be finalised and launched. VDAB pilot tests their products with users in order to assess the risk of launching each them. In their first months operating the Lab, VDAB cancelled two products that were still under development. According to the PES, some degree of failure is intrinsic to innovation and it is accepted, and important, to learn from it.

Finally, the Innovation Lab promotes an ecosystem for different stakeholders who seek to provide innovative responses to the challenges posed by the labour market. To do this, it is important to remain open to new ideas and not be see to push one product over the other – the market will decide at testing stage.

2.3. How big is the team and who works in/ for the Lab?

The Innovation Lab operates as an autonomous business unit within VDAB. The Lab is subject to separate planning and budgeting processes, and it falls under the direct supervision of the Chief Executive Officer and the Board. While this means that the Innovation Lab is visible at the highest levels of the organisation, it provides the right conditions to plan and work 'out of the box'.

Since the beginning of the initiative in 2014, the internal organisation of the Lab has evolved to improve effectiveness. New managerial roles were recently introduced:

- Lab manager: this person is responsible for coordinating the Lab team, planning and managing relationships with suppliers. The Lab manager makes suggestions for improvement across the different products.
- Service manager: this person is responsible for specific services and looking at products that can be developed. He/she is responsible to know the products and services VDAB develop, and how these can be evolved.
- Transformation manager: this person is responsible for promoting the transfer of knowledge from the Innovation Lab into the wider VDAB organisation.

The Innovation Lab relies on the strength of a multidisciplinary team. A common denominator to all the profiles it employs is a strong entrepreneurial spirit. This is in line with the wider philosophy of the Lab described earlier. In 2016, the Innovation Lab comprises 15 staff from highly diverse backgrounds, including IT experts, and employment policy experts, individuals from specific business sector, psychologists and anthropologists. Furthermore, the Innovation Lab regularly involves staff from other departments in the PES, as well as non-PES experts from outside the organisation. Different views and different perspectives make the success of the Innovation Lab.

Today, the Lab has established relationships with start-ups and two universities/business schools. Central to its current success, both the KU Leuven University and Vlerick Business School have provided PhD students that participate in the development of new products, analyse the digital transformation of PES services and provide the algorithms that are needed to design new digital products. In return, VDAB offer both PhD students a testing ground for their PhD theses – a win-win situation for all.

Further discussion points with visiting PES

Discussions centred on the composition and the size of the Lab team, with several PES wanting to understand more precisely the balance between IT experts, data scientists and other profiles, such as psychologists.

Moreover, PES sought to discuss how the Innovation Lab is managed in practice, and the support it has managed to receive from the PES's management board. In general, PES around the table agreed that having a degree of autonomy and the support from management are key success factors to innovation. However to maintain that privilege, VDAB explained that the Lab ensures not to compete with core PES services and priorities, and it has to be successful by running alongside and complementing core services.

2.4. Transitioning knowledge into reality (or how to launch a prototype)

Products that are developed by the Innovation Lab need to address *real* needs of PES customers. They also need to be part of the VDAB core 'offer' to customers in order to be useful. This implies that VDAB launches tried, tested and attractive products.

However, the work of the Lab is not limited to *creating* products. It also has a role in **facilitating the transfer of knowledge from the Lab, taking real services and tools** to the PES so that these can offered to and benefit PES customers. This means that the Lab also has to work on how a new product 'fits' the PES services, how it is proposed, how it augments the services, and how it connects with non-digital services. That is what 'transfer of knowledge' means here.

To support this concept, the Innovation Lab promoted co-creation with PES staff to get buy-in. In addition, the lab fostered a community of testers and champions that help to promote innovation on the ground, while supporting a bottom-up approach to identifying new gaps, new needs. This **innovative community** has come together through a series of local workshops, which the Lab used to collect new ideas and test experimental products. These workshops involved both VDAB staff and non-staff as 'external' users.

In addition, transfer of knowledge requires ambassadors. To identify and shape these, the Innovation Lab built on the workshops and set up seven of **'bootcamps'**. Just over 150 colleagues from different departments of VDAB participated in these 'bootcamps', where participants were free to organise themselves and pick the topics they wanted to work on. Participants were chosen by VDAB managers at regional level based on flexible criteria, aiming for people who were more inclined to contribute to innovation and to new ways of working. The aim of these camps were twofold: to generate new ideas (promoting co-creation) and to encourage colleagues to become 'ambassadors' of the Lab' principles. For VDAB, this exercise has provided 'engaged believers' that help to transfer knowledge on the ground, while the Lab accesses practitioners who help to 'future-proof' their new ideas. VDAB also encourages mentors to train senior executives to help them understand data science. This is part of the process of creating an innovative culture across the organisation.

Finally, bootcamps gave rise to **Business Barometer sessions**. Composed of 15 colleagues from bootcamps, these sessions provide the Lab with a dedicated community of innovators who are regularly asked to input and feedback on existing products.

What products are at the stage of transfer?

Transfer of knowledge (in practice) was illustrated through several pilot products, which are currently at different stages of the transfer process. VDAB showcased four products that currently sit on the Innovation Lab Platform ('Vick'):

- *Mycoach*: an online-coach to help young people with job applications.
- *Mentor*: a matching tool for school-leavers to connect with committed professionals.
- *Mirror*: a collection of mini-apps providing insights about mobility, competitiveness, paperwork etc.
- *Hi-App*: a network app to connect refugees with volunteers in order to share information on work, housing, administration or leisure.

On a more strategic note, the Innovation Lab hopes to cement a stable innovation community to engage in **bottom-up innovation** and support continuous digital transformation of the PES. Looking ahead, the PES looks to achieve this by setting up a crowdfunding platform and formalising the roles of its community of 150 in-house innovators.

3. Zoom on two products

The Follow-up Visit provided an excellent opportunity to show, in detail, some of the Lab's advanced and successfully launched products: the competence-based matching system and the recommender system for vacancies attracted much interest from visiting PES.

3.1. Competence based matching – a success story from Flanders to Malta

VDAB uses a specific system to **support matching of jobseekers and employers' vacancies**. More specifically, the systems focuses on matching **competences**, which VDAB adapted from a competence framework developed by the French PES: ROME code (Répertoire Opérationnel des Métiers et des Emplois[2]). The objective of this system is to help employers advertise vacancies that are systematically detailed and sufficiently comprehensive, and match these vacancies against jobseekers with equally comprehensive competency profiles – in order to generate closer and more accurate matches in VDAB's systems.

Through VDAB's system, employers need to register to be able to post vacancies and to partner with VDAB to access the jobseeker profiles. Employers who publish a vacancy also record, in detail, the competences that are required for the vacancy on offer[3]. To aid this process, the system provides a list of competences generally associated with the profession, against which an employer registers the vacancy. The demonstration by VDAB presented exhaustive lists of competences for a range of professions, supplemented by skills and capabilities associated with individual competences, further options for employers to clarify the level of competency required (using a simple sliding scale), and the possibility to distinguish between essential versus desired competences. In addition, employers can add other competences pertaining to a specific vacancy, therewith creating accurate vacancies for jobseekers to consult.

For jobseekers, the system mirrors the competence lists that employers use, insofar as jobseekers can enter their competences into the system in two ways: they can set up a profile by clicking on a given profession and go through associated competences (in the same way as employers do); or they create a tailored profile beyond specific competence lists (while being able to use these too). Either way, the jobseeker and employer views of the system share similar features such as the sliding scale to rank the level of competency or the ability to tailor profiles and assign preferences.

After an employer sets up a competence-based vacancy, the system searches for candidates within VDAB's database. The employer is informed about CVs that meet the requirements (by % of requirements met) and provides a matching score. Results can be re-defined and filtered by the employer, simply by modifying the importance of a required competency or altering the level of competency required.

It is important to note that the system is based on an open data approach, which means that partners and external organisations can use VDAB's vacancy system in a transparent manner. This includes the ability to register vacancies in the same way as individual employers would.

Success story: from Flanders to Malta with success

In July 2016 VDAB successfully exported the competence-based matching concept to the Maltese PES, both PES closely collaborating to find a solution that would be easily exported. It was agreed that VDAB would create an English version of all the competences listed in their systems so that it could be used by the Maltese PES. Today, the Maltese PES operate the interface of the competence-based system (employers and jobseekers can input their data and preferences locally), and the data is exported to VDAB who then report back on results / matches. Both PES have found this experience highly successful.

Please, click on this **link** for further information.

2 Further information: http://www.pole-emploi.fr/candidat/le-code-rome-et-les-fiches-metiers-@/article.jspz?id=60702

3 See promotional video: https://www.youtube.com/watch?v=9Hl9vK0efUM

Today, the system is fully operational and VDAB is satisfied with the results obtained so far. However, the PES are currently undertaking a large-scale mapping exercise to ensure that the system incorporates ESCO classifications in the future – in an effort to continuously adapt its systems to changing labour market needs.

3.2. Managing vacancies – Recommender: the Amazon of the labour market

The Innovation Lab is also working to improve matching, recently using Big Data to recommend vacancies to a jobseeker when they access the VDAB's vacancy system.

To date, VDAB operates an expert matching system called 'ELISE'. The system matches explicit job interest with the description of a vacancy. When a vacancy is entered into the VDAB database, the information is sent to the ELISE server and ELISE matches the vacancy with jobseekers' data. Vacancies with a high matching score are automatically sent to jobseekers, which is central to VDAB activation policy. Jobseekers can adjust weights and rules in order to receive more accurate vacancies.

In 2016 a *Recommender system* was developed, based on 'software tools and techniques which make *suggestions* that are of use to the user' [4]. This approach follows two objectives: finding out which users are interested in which vacancies (by looking at what they click on, what they read, open and look at); and predicting a jobseeker's interest in other vacancies (by looking at what similar users have looked at, analysing behaviours). VDAB seeks to make both accurate and extended recommendations to jobseekers through this system, looking to open the pool of jobs that a jobseeker could find interesting based on a range of preferences that are expressed in the vacancy. The interest of a user is collected through:

- Explicit user interest: Clicking on vacancies, feedback in liking or disliking vacancies;
- Implicit user interest: adding information that is captured by tracking and analysing the behaviour of a user. (e.g. Actual time spent on reading vacancies)

VDAB are currently testing the Recommender system on a set of counsellors and jobseekers.

4 Shapira, B., Ricci, F., Kantor, P. B., & Rokach, L. (2011). Recommender Systems Handbook.

Further discussion points with visiting PES

Discussions sought to clarify the benefits and the limitations of Recommender-type systems in the context of PES services. Some PES underlined that the Recommender systems would be most useful for jobseekers needing to re-orientate their job search, while others looked to understand how the PES ensures that recommendations are actually relevant and useful. VDAB clarified that the system is currently undergoing thorough testing by experienced job counsellors, in order to adjust it before launching it as a formal PES service.

Some PES reflected more generally on how they can improve vacancies-related information that jobseeker receive. Here, the Dutch PES highlights how their system provides jobseekers with a ranking of vacancies that best match their CV, while also showing all other job offers that match their profile.

Finally, discussions covered data protection rules and how PES ensure that customers are aware that systems use their data in a digitalised job-matching context. PES underlined the need to be transparent and keep customers informed at all times.

4. Next steps for VDAB's Innovation Lab

The Innovation Lab is constantly working on new tools to improve VDAB services to PES customers. During the Follow-up Visit, VDAB presented two new prototype approaches that are currently under development: the use of *predictive modelling* and of the development of *cognitive computing*.

4.1. Cognitive computing

Cognitive computing is understood as the combination of artificial intelligence and machine-learning algorithms in order to r**eproduce the human behaviour**. For VDAB and the Innovation Lab, it is a priority to research how cognitive computing and artificial intelligence applications will improve services delivered to PES customers.

The opportunities offered by cognitive technologies push the PES to consider their services and products in the following way:

Lessons learnt from experiencing with cognitive computing

VDAB identified the following lessons from experiencing with cognitive computing:

- Involving PES staff as soon as possible reduces the natural resistance to change.
- Innovating using cognitive technologies is best done by first assessing how best to use them. PES should always aim to improve their services and meet customers' needs first.
- Integrating all the data that is available is crucial, in order to develop technologies. But internal databases need to be connected and work as a system, avoiding silos.
- Innovating in this field needs to stay useful to the end user, and it can influence other organisations too.

- Providing matching systems that work – improving the effectiveness of current matching systems to find adequate jobs and candidates for employers.
- Games to replace lengthy questionnaires – exploring methods that are attractive and friendly for customers.
- Your advisor – using new technologies that allow to provide a 24/7 service to customers.
- Consider data analytics as a service (AaaS) – discovering how data analytics helps to obtain the most accurate information from data.

Today, VDAB already applies this technology in the mobile App 'Mycoach'. This App consists of a digital job coach that supports jobseekers (mainly focused on young people) throughout their working life. The tool provides immediate, simple and personalised service to both jobseekers and people who are in work. With the help of this tool, the user first establishes his/her goals and prepares a plan to achieve them. The App gives tips on how to improve job applications, by preparing a draft CV and identifying a candidate's competences.

The advantage of this tool is that jobseekers can use the App without limitation in time or location. For the PES, MyCoach frees time from job counsellors, so that they can focus their attention on customers with bigger needs.

4.2. Predictive modelling

In line with VDAB's priority to foster artificial intelligence, the Innovation Lab is developing predictive models to enhance their services. Current models aim to predict how long a person will be unemployed and therefore requiring VDAB services. Based on these predictions, the PES can better decide what level of support is required for each jobseeker. This helps the PES to provide a more individualised service to each customer, and offer more targeted job counselling services. It also helps the PES to be more efficient in the use of their resources.

VDAB's modelling is based on a three-step logic:

1. Analyse the data collected from the jobseeker and report against a series of indicators. At this stage of experimentation, three sets of data are collected:

    a. Unemployment periods, which includes the date of entering and leaving unemployment and the person's labour market status.

    b. Dossier data, which consists of identification data (e.g. age, sex, nationality), employment and education records (e.g. studies, work history, vocational training, certificates), data on competences (e.g. labour market competences, personal competences).

    c. Information on vacancies searched by the jobseeker and on their 'click behaviour'.

2. Categorise the jobseeker based on either a low, medium or high risk of unemployment. Using data collected on the jobseekers, the system can also identify key factors that can help finding work.

3. Propose tailored recommendations to increase the chances of a jobseeker finding a job. After testing different options, VDAB opted to define categories or clusters of professions against which jobseekers' work opportunities are measured. A total of 53 clusters (or professional sectors) have been created to date.

Based on this information, the system would be able to identify in which cluster a jobseeker has more opportunities to find a job. Also, it would help to identify which indicators of the person are increasing or decreasing their chances of finding a job. Based on that information, the system will

Lessons learnt from experiencing with cognitive computing

The Innovation Lab identified the following steps for the future:

- VDAB does not access data on jobseekers after they leave the PES. However, this information would be useful to improve predictive modelling. VDAB are currently looking at different options to collect this data in the future.
- VDAB look to obtain more data from jobseekers' CVs through text mining. It is possible to develop robust techniques that automatically collect information from CVs and save time for job counsellors.
- In order to make more accurate recommendations, the predictive modelling tool will be tested by VDAB's counsellors and their feedback will be incorporated into the predictive model.
- Finally, VDAB plans to redesign the dashboard that would be used by VDAB's counsellors to visualise results from predictions.

be able to recommend steps forward to increase their chances or identify other cluster (sector) where the jobseekers may have more options to find a job.

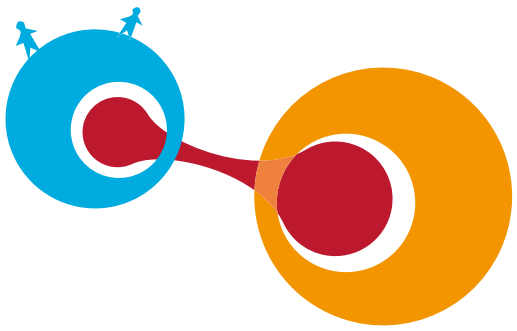
Predictive modelling is currently a prototype and it is therefore under revision. In fact, the model is continuously improved and fine-tuned, and VDAB is regularly testing and optimising the model by refining and/or using new algorithms (going from decision trees to neural networks to random forests).

5. Conclusions

VDAB's innovative approach is well established. Over time, the Innovation Lab developed a *systematic* approach to innovation, and the following points stood out during Follow-up Visit:

- VDAB are not only looking for the best solution, but for a solution that works best for their customers. To that effect, the Lab involves users in the development of new prototypes and tests each product to see if they meet expectations.
- Engaging customers is key, but it does not mean starting from a blank sheet of paper (i.e scoping the engagement around a specific product is more productive).
- A Lab of this nature needs funding, proof of concept, and political support to working differently. Having the authority to fail is a good way to set up innovatory environments.
- For the PES: thinking about what the PES would be / do if it did not exist today gives the opportunity to look at the organisation from scratch. For VDAB, the Innovation Lab is not a place, it is a state of mind.
- The Lab's work and success are stimulated by a strong culture of innovation. Such a culture helps to get the support from the organisation and reduces internal resistance to change.
- Ensuring that key staff are involved, and embracing the premise that senior managers will be the 'learners'. Creating an innovative 'community' helps to foster an adequate environment for the successful transfer of knowledge from the Lab to the wider PES.
- Finally, not all people in a PES organisation have the same level of understanding when it comes to technology and digital agility: raising awareness and staff education is central for buy-in.

VDAB has clearly given priority to innovation through the creation of its Innovation Lab and the 'process' of innovation never stops. Tomorrow, the Lab will continue to explore new applications for IT technologies, and it will continue to look for new ways to use data more intelligently and improve PES services.



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