The Use Case Observatory

A 3-year monitoring of 30 reuse cases to understand the economic, governmental, social, and environmental impact of open data

Volume I

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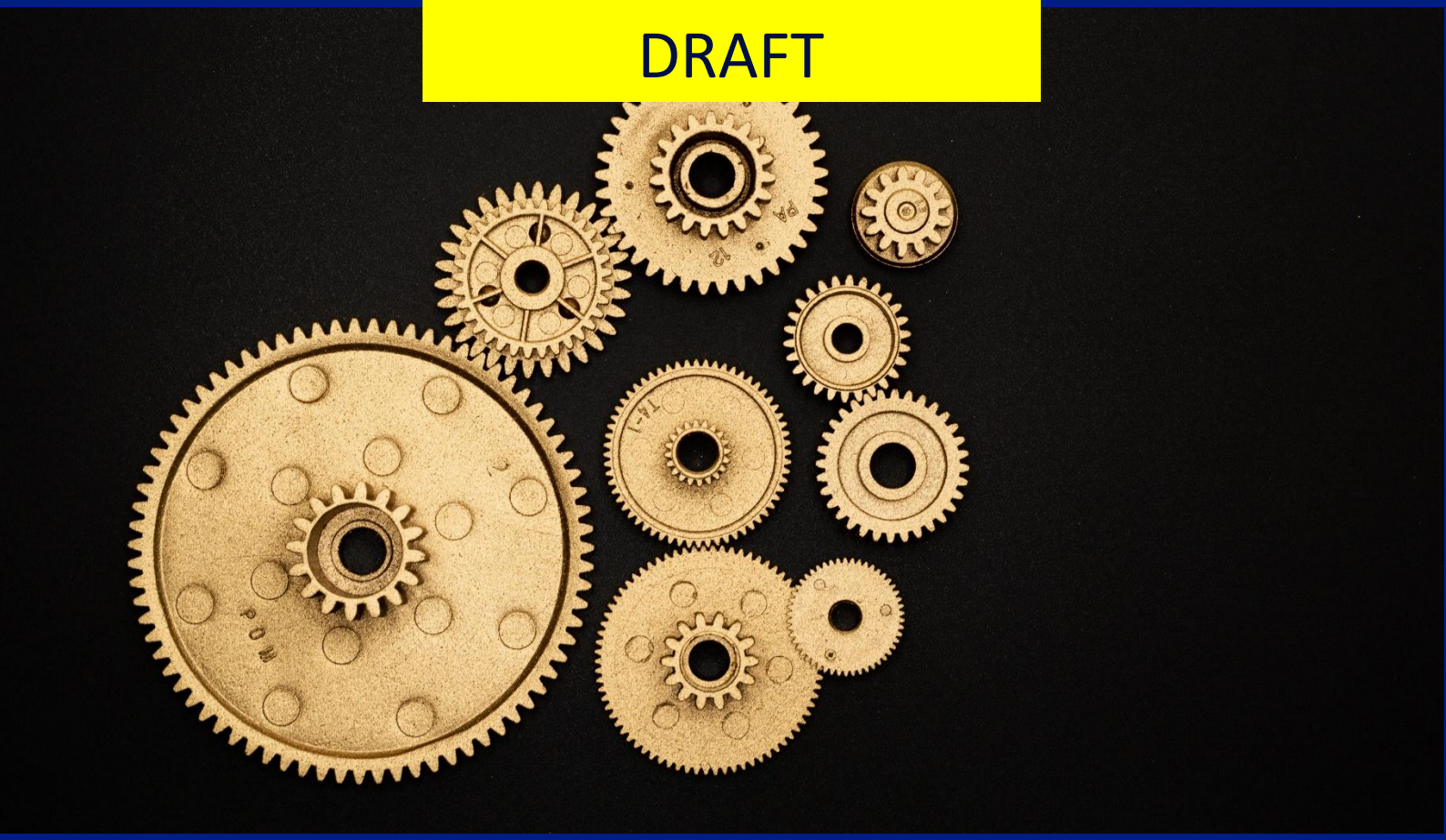

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Publications Office of the European Union

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A 3-year monitoring of 30 re-use cases to understand the economic, governmental, social, and environmental impact of open data

Volume I

Luxembourg, 2022

This study has been prepared as part of data.europa.eu. Data.europa.eu is an initiative of the European Commission. The Publications Office of the European Union is responsible for contract management of data.europa.eu.

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Last update: XX October 2022
https://data.europa.eu/

ISBN XXX ISSN XXX doi:XXX XXX

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Executive summary

The Use Case Observatory is a research project that follows 30 re-use cases over the course of three years – from 2022 to 2025 – to assess how impact is created with open data, to share challenges and achievements of open data re-use cases, and to add to the debate on an open data impact assessment methodology. This report is the first of three editions: the second and the third will be published in 2024 and 2025.

For each of the re-use cases in this report, interviews were held with their developers, and clustered into four impact dimensions: economic, governmental, social, and environmental. The interviews with re-use cases that realise *economic impact* show how open data is used to help companies identify promising public procurement tenders, apply for jobs and further professional opportunities. The *governmental impact* re-use cases prove that open data can increase the transparency of political processes and strengthen democracy. As part of the *social impact* domain, re-use cases in this report use open data to improve public health and incentivise a more inclusive society. Finally, several re-use cases create *environmental impact* by monitoring air quality as well as supporting the preservation of forests.

Estimating the impact of re-use cases is complex. The measurement of precise gains for the economy, government, society, or the environment requires a substantial research and, importantly, data. Most re-use cases measure their impact with web statistics. Yet, the number of unique visitors or the number of views of a web page only serve as a rough estimate. Information such as revenues or the number of clients would likely provide a better view of impact, but SMEs generally want to protect this information because it is commercially sensitive.

Besides estimating their current impact, interviewees were also asked to forecast their impact in the next three years. The answers here ranged from minor impacts to impressive ambitions. However, a common challenge to realise both small and big plans seems to be receiving appropriate funding to scale up the services.

Overall, the power of open data re-use, but also shows the need to further unlock the potential of open data, allowing its re-use to have a clear impact on our economy, government, society, and environment. This requires supporting the community of re-users to identify financial opportunities, but also a better understanding of how open data impact is created and measured. While this first report introduces the 30 re-use cases monitored, the second and the third reports – that will be published in 2024 and 2025 respectively – will focus more on evaluating the progress from one year to another. More emphasis will be placed on ascertaining achievements and challenges in the space of three years and extrapolating concrete insights for improving methodologies of open data impact assessments.

1. Introduction

The Use Case Observatory is a research project by data.europa.eu, the official portal for European open data, managed by the Publications Office of the European Union. The Use Case Observatory – hereafter referred to as ´the Observatory` - contributes to the portal´s broader goal of measuring the impact of open data across Europe.

By monitoring 30 re-use cases of open data over three years – from 2022 to 2025 – the relevance of the Observatory is fourfold. Firstly, by following each of the 30 re-use cases, the Observatory shows how open data creates impact from an economic, governmental, societal and environmental perspective. Secondly, by analysing the achievements and challenges of re-use cases over a longer period, the Observatory allows other open data enthusiasts to learn and increase the overall impact of open data. Thirdly, the long-term monitoring of the re-use cases outlines the entire impact trajectory: from the collection and process of public data to the delivery of the re-use case to the benefit of our economy, government, society and environment. Finally, as measuring the impact of open data remains a challenge, both in Europe and globally, the Observatory provides useful insights into the debate on the potential benefits and the several existing approaches of open data impact assessment.

Through the publications of three analytical reports – one in 2022, one in 2024, and the last one in 2025 – the Observatory tries to answer the following questions:

- *What is the economic, governmental, social and environmental impact of open data for the 30 specific re-use cases collected?*
- *How important is it to keep track of such re-use cases to understand and foster value creation through open data in Europe?*
- *What else can be learned from the analysed re-use cases to improve open data measurement and implementation across Europe?*

As the first analytical report of the Observatory series, this volume sets the stage for the analyses that will be published in 2024 and 2025. Its aim is to introduce the 30 re-use cases in terms of the services they offer, the (open) data they use, and the impact they have at the moment of writing (namely July-September 2022). The second and third reports will expand on the findings reported in this first volume and highlight changes in the development and impact of the same 30 re-use cases reported here. Therefore, the driving questions mentioned above will not find a complete answer in this report, but only at the end of the research project and the publication of the third and last volume in 2025.

The rest of this report is structured as follows. Chapter 2 focuses on the methodological approach taken for selecting and analysing the 30 re-use cases. Chapter 3 presents the re-use cases along the four impact dimensions considered - economic, governmental, social, and environmental. Finally, Chapter 4 sums up the general findings and lessons learned from this first part of the research project and provides an overview of the next steps for the Observatory.

2. Methodology

The 30 re-use cases participating in the Observatory were selected from data.europa.eu´s repository based on three main sources:

- The Open Data Maturity (ODM) assessment, a landscaping exercise performed every year by data.europa.eu and providing numerous examples of impact creation from EU Member States, EFTA and further countries in Europe;
- The EU Datathon, a yearly data-driven competition organised by the Publication Office of the European Union and offering excellent examples of open data re-use across Europe;
- The re-use cases available on data.europa.eu's use case repository, which were partially collected by the data.europa.eu team and partially provided via data.europa.eu's contact form by data providers in Europe.

Drawing from this inventory, more than 600 re-use cases were identified. To reach the 30 final re-use cases, several criteria were used.

Firstly, only re-use cases of applications, platforms or websites developed in Europe were considered. The intention was to keep a fair balance of re-use cases from EU Member States, including examples from the UK, EFTA countries as well as neighbouring countries. In a second step, the focus was placed exclusively on re-use cases belonging to specific sectors in the inventory with the aim of retaining a good mix of re-use cases having an economic, governmental, social and environmental impact – the four impact dimensions on which also the Open Data Maturity assessment is based.

- The **economic impact dimension** was defined as including re-use cases in the area of business creation and/or entrepreneurship as well as (re-)skilling of workers;
- The **governmental impact dimension** referred to re-use cases in the area of e-government support, government transparency and accountability;
- The **social impact dimension** was agreed to encompass re-use cases in the area of healthcare and well-being, as well as integration and fighting against inequality in society;
- The **environmental impact dimension** was understood as referring to re-use cases in the area of environmental-friendly services and energy reduction.

The final 30 re-use cases were selected based on three criteria: whether re-use cases received an award in the last three years (e.g., an EU Datathon prize); whether their beneficiaries are women, ethnic minorities, NEETs (i.e., people Not in Education, Employment, or Training) or any other disadvantaged group in society (e.g., refugees); and whether the re-use cases respond to a crucial challenge of our time, in line with the European Commission's priorities for 2019-2024.

This methodological approach provided a shortlist of 150 re-use cases, which were contacted either via e-mail or through social media (e.g., Twitter and LinkedIn) to confirm their availability and interest in taking part in the research. By reaching out to more re-use cases than the target number, it was possible to eventually find 30 suitable re-use cases willing to participate.

Developers of the 30 re-use cases were interviewed[1] in a semi-structured way via videoconference, such as Microsoft Teams or Webex. The interview was conducted in the form of an open discussion based on indicative questions[2] shared in advance with the interviewee(s). The questions addressed the

[1] A complete list of interviewees and respective contacts can be found in the Annex.
[2] A draft of the questions can be found in the Annex.

purpose of the re-use case, the open data used, and the impact that the re-use case has at the moment and should have in the three coming years. Due to time constraints, some interviewees did not participate in the 30-min interview but provided their answers in written form.

Table 1 shows the 30 re-use cases participating in the Observatory research project, their country of origin, the impact dimension they were classified in, and the source of the use case. Overall, all methodological steps were respected with only few deviations and adaptations because of a lower response rate than expected due to the summer period.

The final mix of participants represent the EU´s northern, southern, eastern, and western corners. Yet, it comprises only one re-use case from an EFTA country (i.e., Norway), two from the United Kingdom, and one from a neighbouring country, namely Georgia. In terms of impact dimensions, the re-use cases are quite diverse, with five economic, seven governmental, ten social and eight environmental examples. While the re-use cases correspond broadly to the definitions of the impact dimensions, it was not always possible to have a perfect match between the areas of re-use cases mentioned above and the re-use cases identified. For example, several re-use cases in the area of healthcare and well-being did participate, but no re-use case in the field of energy reduction was included. Similarly, not all 30 re-use cases have recently won an award, benefit women, ethnic minorities, disadvantaged groups in society, or do correspond to the European Commission's policy priorities. However, at least 25 re-use cases do relate to one or more of the latter criteria[3].

[3] More details on this relation can be found in the respective reuse cases´ analyses (Chapter 3).

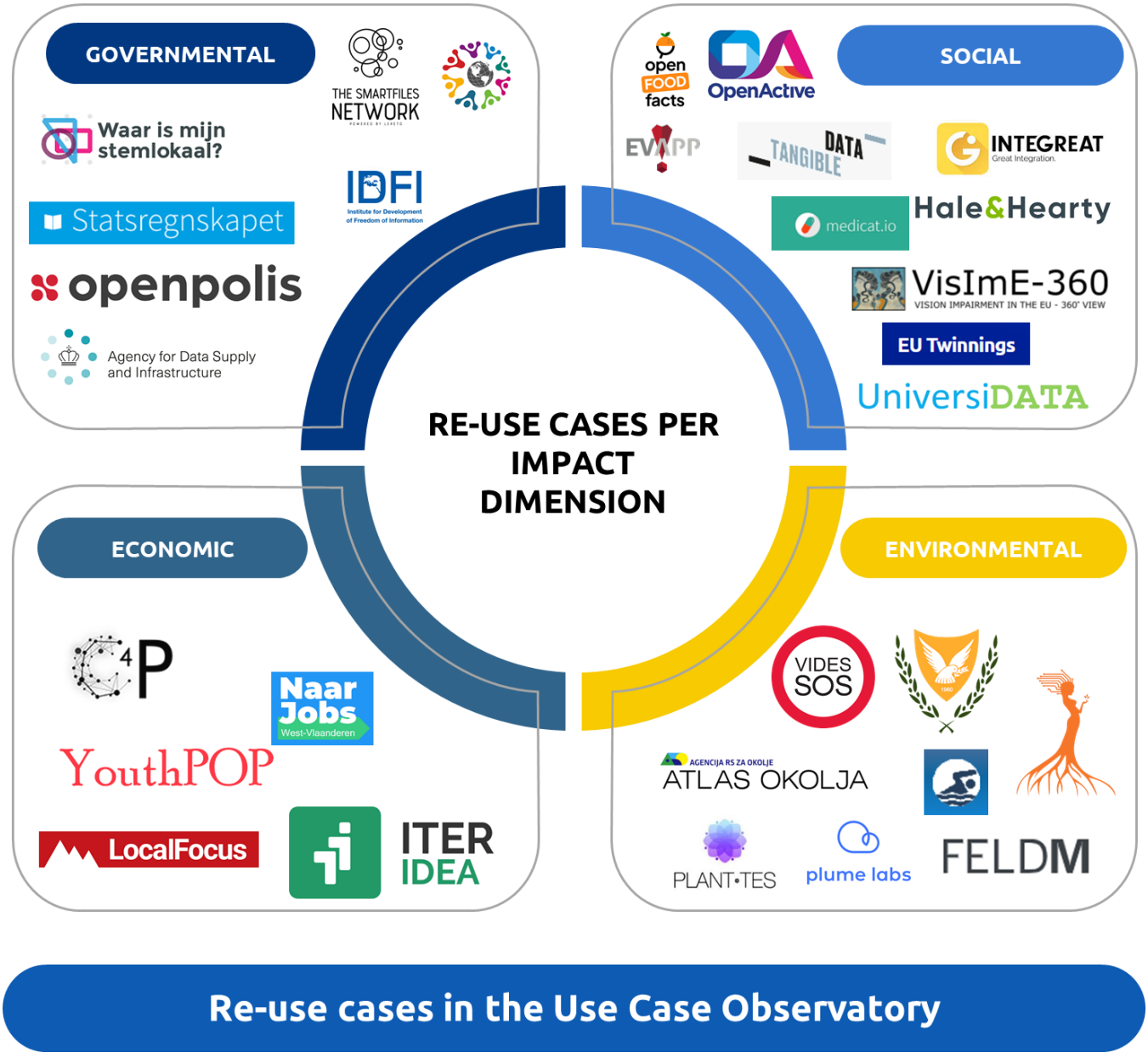
Table 1. Overview of participating re-use cases along the selection criteria

Nr	Re-use case name	Country of origin	Impact dimension	Use case source	Further criteria
1	C4P	Belgium	Economic	EU Datathon	An economy that works for people
2	WWW by ITER IDEA	Italy	Economic	EU Datathon	Focus on women
3	YouthPop	Greece	Economic	EU Datathon	Focus on NEETs
4	LocalFocus	The Netherlands	Economic	Use Case Repository	n/a
5	Naar Jobs in West-Vlaanderen	Belgium	Economic	ODM	An economy that works for people
6	the Smartfiles Network	Austria	Governmental	EU Datathon	A Europe fit for the digital age
7	3D city model	Denmark	Governmental	Use Case Repository	n/a
8	Waar is mijn stemlokaal	The Netherlands	Governmental	Use Case Repository	A new push for European democracy
9	OpenPolis	Italy	Governmental	Use Case Repository	A new push for European democracy
10	Next Generation Democracy	Denmark	Governmental	EU Datathon	A new push for European democracy
11	Statsregnkapet	Norway	Governmental	Use Case Repository	A new push for European democracy
12	IDFI	Georgia	Governmental	Use Case Repository	A new push for European democracy
13	Medicatio	France	Social	EU Datathon	n/a
14	UniversiDATALab	Spain	Social	Use Case Repository	A Europe fit for the digital age
15	ViSimE-360	Italy	Social	EU Datathon	n/a
16	Open Active	United Kingdom	Social	Use Case Repository	n/a
17	Tangible Data	Italy	Social	Datathon	A Europe fit for the digital age
18	Hale & Hearty	Ireland	Social	Use Case Repository	n/a
19	EU Twinnings	United Kingdom	Social	EU Datathon	n/a
20	OpenFoodFacts	France	Social	ODM	n/a
21	Integreat	Germany	Social	Use Case Repository	Focuses on migrants and refugees
22	EV-app	Belgium	Social	ODM	n/a
23	Digital Forest Dryads	Romania	Environmental	EU Datathon	A European Green Deal
24	Air Quality Cyprus	Cyprus	Environmental	Use Case Repository	A Europe fit for the digital age
25	Vides SOS	Latvia	Environmental	ODM	A European Green Deal
26	Planttes	Spain	Environmental	Use Case Repository	A European Green Deal
27	Atlas Okolja	Slovenia	Environmental	Use Case Repository	A European Green Deal
28	Plume Labs	France	Environmental	Use Case Repository	A European Green Deal
29	Baltazar	Croatia	Environmental	ODM	n/a
30	Environ-Mate	Germany	Environmental	EU Datathon	A European Green Deal

3. Re-use Cases Analyses

This chapter presents the 30 re-use cases clustered along the four impact dimensions. Figure 1 provides an overview of this clustering into economic, governmental, social and environmental impact. This section also presents a short summary for each of the re-use cases, as a snapshot of the articles presented later in this chapter.

Figure 1. Clustering of open data re-use cases per impact dimension



Re-use cases in the Use Case Observatory

Economic impact (5 use cases)

1. **C4P (Belgium)** uses a machine learning algorithm to provide insight into public procurement opportunities from EU institutions and helps clients to find the right tenders and possible consortium partners;
2. **Wonder Wanderlust Women (Italy) by ITER IDEA** offers a portal for women between 20 and 35 years old who would like to discover new mobility paths and job opportunities across Europe;
3. **The YouthPOP web application (Greece)** combines historic TED data with machine learning technology to develop an e-tool that empowers young job seekers and entrepreneurs to engage in public procurement processes;
4. **LocalFocus (the Netherlands)** is a platform that provides journalists with a selection of interesting open datasets, easy data visualisation tools and analyses that can be used in articles;
5. **Naar Jobs in West-Vlaanderen (Belgium)** - *To Jobs in West-Flanders* - helps people find jobs close to them and lets users select whether they will travel by bike, car or train. The application also provides information on the transport options provided by employers to new employees.

Governmental impact (7 use cases)

1. **The Smartfiles Network (Austria)** extracts semantics from a PDF text of case law and relies on network analysis methods to visualise the evolution and interconnectedness of the document with other decisions;
2. **The object-based city model (Denmark)** is a 3D-presentation of Aarhus that can be used for climate adaptation, green conversion, urban planning, land management and much more;
3. **The Waar is mijn stemlokaal (the Netherlands)** - *Where is my polling station* - platform helps users find a suitable polling station close to them. Citizens can also find information about opening times and whether the polling stations are usable for people with certain disabilities;
4. **The foundation Openpolis (Italy)** gathers, analyses, and uses open data for various projects that explain socio-economic and political dynamics in Italy;
5. **Next Generation Democracy (Denmark)** developed a data-driven solution that enables citizens to follow the work of Members of the European Parliament (MEPs) and engage directly with them;
6. **Statsregnskapet.no (Norway)** is a website that visualises government spending and budgets. Their goal is to facilitate financial transparency and enable the public to easily find information about the spending of resources by government administrations;
7. **IDFI (Georgia)** makes governmental data openly available for users on its open data portal, and evaluates the transparency of Georgia's government institutions.

Social impact (10 use cases)

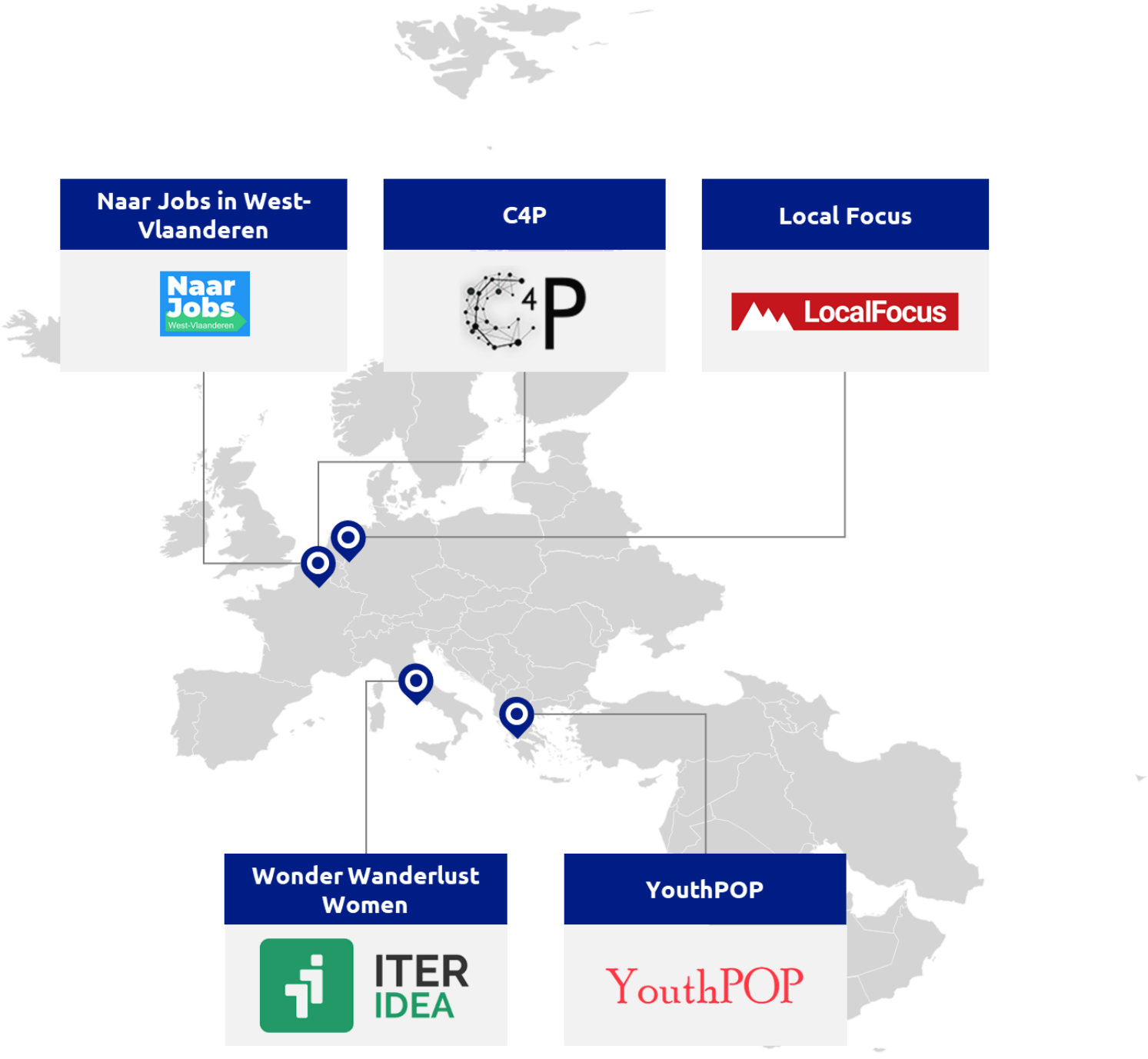
1. **Medicatio (France)** is a platform publishing data on all available drugs in France to facilitate citizens´ access to medical information and allow health professionals to keep track of legal and commercial changes;
2. **UniversiDATALab (Spain)** is a repository of the analytical applications based on the open data published by the six Spanish universities part of the portal UniversiDATA. Its aim is to transform the static analyses of a portal´ section into dynamic results;
3. **VisImE-360 (Italy)** explains in a single information web space the Eurostat´s data on visual impairment, helping to allocate resources for medical aid;

4. **Open Active (United Kingdom)** is a project by the Open Data Institute and UK Active to make open data on physical activities in the UK available and easily bookable;
5. **Tangible data (Italy)** transforms data from its digital context to a physical context by creating data sculptures in the public space, which help people who lack certain digital skills to experience the data;
6. **Hale & Hearty (Ireland)** is a knowledgebased platform and web application created by the Irish government to make health and wellbeing information more accessible and incentivize citizens to live a healthier lifestyle;
7. **EU Twinnings (United Kingdom)** is a website that uses open data from Eurostat to make statistics accessible to a wider audience and show similarities across EU regions;
8. **Open Food Facts (France)** is a large database of food products creating easy to understand information about the nutritional value and the environmental impact of food;
9. **Integreat (Germany)** is a digital platform that provides all relevant information in several languages at the municipal level to newly arrived migrants and refugees;
10. **EVapp (Belgium)** is an application sending volunteers with first aid diplomas as quickly as possible to someone having a heart attack.

Environmental impact (8 uses cases)

1. **Digital Forest Dryads' application (Romania)** aims to protect forests from illegal deforestation in Europe by combining aerial and multi-spectral satellite imagery;
2. **Air Quality Cyprus (Cyprus)** provides citizens with real time information about several forms of air pollution. Users can find the data online or choose to be proactively informed about certain substances via the application on their smartphone;
3. **Vides SOS (Latvia)** is an application designed to alert the State Environmental Service about environmental hazards such as pollution, waste, and litter in nature;
4. **Planttes (Spain)** is a citizen science application that informs users about which plants are in bloom and whether this might be of effect to any people with pollen allergies;
5. **Atlas Okolja - ´Environmental Atlas` - (Slovenia)** presents a map of Slovenia combining a range of different sources, such as noise-pollution, air-pollution, earthquakes and Natura 2000 areas;
6. **Plume Labs (France)** is a start-up recently acquired by Accuweather that uses open data to forecast air quality globally;
7. **Baltazar (Croatia)** measures water quality on beaches in Croatia. The data is further enriched with information about air temperature, wind speed and beach facilities;
8. **Environ-Mate (Germany)** is an interactive platform to empower children with knowledge about climate change based on scientific data.

3.1.Economic Impact Dimension



C4P: using Open Data and AI to help organisations find the right public procurement opportunities

C4P in a nutshell:

- **Service:** C4P develops ML algorithms to provide insights into public procurement opportunities from EU institutions and helps clients find the right tenders and consortium partners
- **Sector:** public procurement
- **Country of origin:** Belgium
- **Data sources:** open data from Tenders Electronic Daily (TED), Financial Transparency System of the European Commission, national procurement portals
- **Number of employees:** 5-10
- **Website:** c4p.io

C4P was founded in 2017, won the EU Datathon in the same year, and has been growing steadily ever since. The organisation **uses AI to provide insight in public procurement opportunities** from EU institutions and national public sector. These opportunities are published and updated daily on **Tenders Electronic Daily (TED),** Europe's dedicated portal to this end. Although all tenders are publicly available, it can be a challenge to find the opportunity that suits the competencies of your organisation best. To help organisations solve this issue, C4P has created a machine learning algorithm to support clients in finding the right opportunities.

What services does C4P offer?

C4P makes their own **classification of tenders**, making it easier for users to find the tenders they are looking for. Their Machine Learning algorithm uses the title of the tender (around ten words) and the description (around four sentences), to come up with more relevant classifications than currently offered by TED. To give an example: a European institution launches a new opportunity about software development services. The title of the procurement is something like ´Software development service for the European Commission` and the description reads ´The European Commission is looking for a provider of software development in Java`. The functionary who encoded this opportunity might have use the most obvious tags, such as ´IT services` but might also have missed other relevant tags, such as software and Java. C4P's algorithm provides a more accurate classification of tenders.

Additional to the classification algorithm, C4P also tracks who won previous tenders in a certain field. In that way, clients of C4P can **identify competitors and possible collaborators**. Based on the data of past winners, C4P makes predictions for the organisations that are most likely to win a tender that has just been put into the market. They provide a list with the top five candidates to their client, and the client can subsequently decide to reach out to them to form a consortium.

The clients of C4P can be found in all segments and sectors: large enterprises use their help to find the perfect opportunities and partners. For smaller SMEs, and especially new entrants, the work of C4P can be extremely relevant. For example, the barriers to entry the market for an SME somewhere in Europe could be lowered by having clear information on competition and potential collaborators.

What data does C4P use?

The TED portal from the European institutions allows users to download the raw data in xml format. C4P does a daily download of the data to update their algorithms. Recently, **C4P has also started to expand beyond the TED portal** and also looks at tenders from UK's Contracts Finder and Belgium's Public Procurement website. Furthermore, C4P uses open data from the European Commission's Financial Transparency System, in which the European Commission services publish their annual accounts, i.e., the commitments done on their financial system. TED and the financial transparency system complement each other, providing a full picture of public procurement: TED shows how procurement was awarded and the financial transparency system how it was implemented. This further improves the insights generated by C4P.

C4P would not exist without open data. This goes so far that C4P **only uses open data and no other data sources**. Still, after downloading the open data, a lot of work still needs to be done. The data needs to be cleaned and structure appropriately before the machine learning algorithm can do its job. Moreover, data needs to be normalised and standardised to be able to draw the right conclusions. To give an example of such standardisation: company names can be written in many different forms, such as Company XYX, XYZ Co., or XYZ, part of consortium A. Cleaning and standardisation is required to make the date accurate and usable.

How does C4P realise impact?

C4P focuses on the entire **European Public Procurement market**. Since Europe is in the middle of the twin transition towards a more digital and a more sustainable continent, the tender market also contains numerous opportunities in those fields. Hence, the Green Deal, the digitalisation – digital health especially – are the topics that C4P´s clients and in general business interested in and where C4P creates impact.

Measuring the precise impact of organisations like C4P is a complex challenge. It is impossible to provide client data and assess whether clients of C4P would have found the same tenders on their own as well eventually. Still, organisations that work with C4P are often long-term clients and happy with their work. Looking back on the past five years since the victory in the EU Datathon, C4P has grown from a company of two people with a functional prototype into a SME that grows steadily, increases its client portfolios, and retains clients. The EU Datathon win was one of the first signs that showed them that they were on the right track.

Looking ahead, C4P wants to keep **improving its algorithm in the coming years**. Procurement is used just as a first market that C4P´s team knows very well, but the hope is to **extend products to other markets** as well. Yet, for the next years, C4P will not leave the procurement market until it has gained a complete picture for instance of how to allow its software to read tender specifications (often over 100 pages) completely and successfully. Recently, C4P is analysing directly tender specifications aiming at moving away from tender notices and have them replaced through AI-generated tender specifications summaries.

Wonder Wanderlust Women: the open data-based portal facilitating women´s mobility in Europe

Wonder Wanderlust Women in a nutshell:

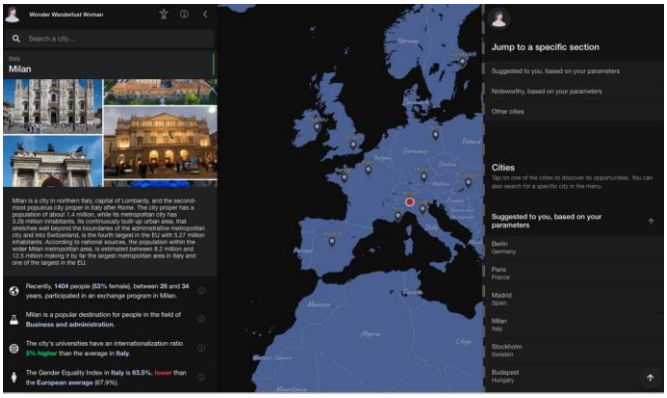
- **Service:** Wonder Wanderlust Women offers a portal for women between 20 and 35 years old who would like to discover new mobility paths and job opportunities across Europe.
- **Sector:** economy, education
- **Country of origin:** Italy
- **Data sources:** open data from EU institutions and non-public data from universities and further platforms
- **Number of employees:** 5
- **Website:** eu-www.iter-idea.com

Wonder Wanderlust Women (WWW) is the portal with which the Italian start-up ITER IDEA won the category ´An economy that works for people` during the EU Datathon 2021. The idea behind the portal is to **encourage the discovery of new mobility paths and opportunities for young people, especially women**, across Europe. To do so, WWW uses a great availability of open data to guide women between 20 and 35 years old in the search for the most suitable destination in Europe, where to study, work, and live. Since the EU Datathon competition, the WWW team – composed by the three co-founders Sara Baroni, Guido Mazza, Matteo Carbone, and two additional developers – has been expanding its network, collaborating with important entities focused on **gender equality issues** such as Women X Impact and conceiving further data-driven initiatives within the larger context of ITER IDEA start-up.

What services does WWW offer?

WWW consists of a an easy to use and engaging web application that visually displays **opportunities and highlights hidden patterns to help young women between 20 and 35 years old** to select the most suitable European city and country for their next career and life step. Thanks to the ´Accessibility Mode`, it suffices for the user to provide information on their cultural background, country of origin, academic career, spoken languages and the app will suggest all the places that are most likely to match the preferences of the user. Alternatively, WWW also offers the possibility to just wander around the interactive map of Europe and click on specific destinations to find out how many people live there, what is the gender balance in the area, and whether jobs or internship opportunities are available.

Figure 2. WWW interactive map and overview of the information provided for the city of Milan



What data does WWW use?

The information provided on WWW comes from different open data sources, among which data.europa.eu and related portals. WWW relies, for instance, on datasets about Erasmus mobility, gender equality, Wi-Fi4EU areas.

While the role of open data has been crucial to feeding the experiment phase and creating a concrete basement to start developing further, **WWW also uses an amount of not public data** sources, coming from partner universities - such as IUAV Venice-, the platform Numbeo.com - the world´s largest crowd-sourced database on cost of living -, and different sections of the Erasmus Student Network.

The portal - which elaborates over **4 million records to geolocate over 30,000 destinations** - always clearly states the basis of the information shown and provides links to both public and non-public data sources.

Since the data retrieved for the building of the app often came misspelt, handwritten, translated, incomplete or with different layouts, the WWW team had to uniquely resolute the exact location in heterogeneous datasets. To fulfil this aim, they used **ETL techniques** on the data and location technology services powered by **ML capabilities**. Through Amazon Web Service they adopted Location, DynamoDB, and Amazon Aurora. In addition, the team studied how to improve accuracy by integrating the Google Maps service into their ETL pipeline. All this was crucial to geo-reference locations, create more value and save over 80% of input data otherwise lost.

How does WWW realise impact?

WWW targets a clear need in Europe, which is that of supporting the personal and professional growth of young women. In fact, according to various sources among which Istat and OECD, women between 20 and 35 years are experiencing the most difficulties in entering the job markets and represent also one of the categories most affected by the economic consequences of the Covid-19 pandemic. Through the WWW platform, ITER IDEA positively contributes to cope with these challenges. In the weeks following the EU Datathon, WWW has indeed received **120 requests**, with a subsequent stationary trend of **2-5 requests per month**.

While no particular feedback was collected by the app so far, the several collaborations started between the WWW co-founders and other institutions speak in favour of the growing impact that the app could have in the future. For example, the platform has raised the interest of **Women X Impact**, for which Sara Baroni is now brand ambassador. Together with Women X Impact, in November 2022 the team will host two panel discussions, one focused on the WWW platform and a second one addressing the topic of ´Women in Coding`.

Moreover, WWW team is investigating the opportunity to participate in calls of Horizon Europe to support a group of organisations in Italy to deal with violence against women. The idea is to upgrade the WWW app to power Italian women with new digital support to discover essential support opportunities and define getaway strategies.

Looking ahead, the WWW team will increase its effort in raising awareness among investors and companies to enable more investment and belief in social impact tech solutions such as WWW. In line with the objectives of the European Institute for Gender Equality and following the publication in Italy of a standard for gender equality in organisations, the team is also undergoing a rebranding phase for WWW to emphasize the powerful meaning of the community they are creating. The establishment of a new and independent enterprise, **UNA Women (United Network Act),** will be an opportunity to actively interact with the project partners, providing for significant additions within the portal.

YouthPOP: the Greek e-tool to empower young job- seekers and entrepreneurs in public procurement

YouthPop in a nutshell:

- **Service:** YouthPOP web application combines historic TED data with machine learning technology to develop an e-tool that empowers young job seekers and entrepreneurs to engage in public procurement processes.
- **Sector:** job market, public procurement
- **Country of origin:** Greece
- **Data sources:** open data from Tenders Electronic Daily (TED), Eurostat, as well non-public data from the European Skills, Competences, Qualifications and Occupations (ESCO)
- **Number of employees:** 3
- **Website:** youthpop.eu

YouthPOP, Youth Public Open Procurement, is an e-tool developed by Michail Maragkakis, Sofia Lousa, and Konstantinos Maragkakis, within the context of the EU Datathon 2022 competition. The prototype built by the Greek team aims at **facilitating young job seekers´ and entrepreneurs´ access to public procurement process** through a user-friendly and interactive web application based on historic open data from TED as well as Eurostat statistics.

What services does YouthPOP offer?

YouthPOP Project aims to be a hub for young job seekers and business owners – including Small- and Medium-size entities – where to find different kinds of information on public procurement and related opportunities in Europe. As regards job seekers, a first feature of YouthPOP is to present the **latest trends on open procurement contracts** and **connect these trends with specific types of degree and skills**, allowing young people to more easily identify their learning needs and must-haves to get their dream jobs. In this regard, the hub also shows to its young professionals looking to start or change their career the most popular job sectors related to public procurement awarded contracts. Finally, yet not less importantly, the platform provides its **job-seeking users with detailed information on the quality of life** – i.e., in terms of living conditions and purchasing power - of the EU country they might need to relocate to because of a job or business opportunity.

In reference to its second target group, i.e., young entrepreneurs and business owners, YouthPOP simplifies access to information about:

- the probability of success in given open public procurement contracts,
- potential new clients and partners,
- existing competitors.

The services offered by YouthPOP are presented in a user-friendly and interactive way through colourful bubble graphs, tables, and catchy visualisations.

Figure 3. YouthPOP´s interface

What data does YouthPOP use?

To develop YouthPOP, the Greek team combined both open and non-open data. More specifically, the **e-tool relies on open datasets from TED and Eurostat.** Moreover, to be able to match public procurement trends and skills, YouthPOP team also used the **free**, Linked Open Data, easily accessible data from ESCO (European Skills, Competences, Qualifications and Occupations). ESCO is a European Commission project, run by Directorate General Employment, Social Affairs and Inclusion (DG EMPL).

After a process of collection and polishing of this data, the YouthPOP team built the application´s features via machine learning techniques, focusing especially on optimising the functionality of the portal, creating inspiring visualisations, and enhancing the user experience.

How does YouthPOP realise impact?

At the moment, YouthPOP is still in a demo version. Therefore, assessing its impact on the target audience is challenging and premature as the team cannot yet monitoring the performance of the tool through analytics or users´ feedback. Yet, Michail, Sofia, and Konstantinos foresee the integration of such features in the final version of the web application. Moreover, the good performance at the EU Datathon 2022 and the positive input received from peers seem to be encouraging signs about the development of the project.

Looking ahead, the YouthPOP team has also a clear set of ambitions to achieve. Firstly, the team members hope to further develop the brand and **increase their solution´s visibility** through the EU Datathon competition. Secondly, they would like **to invest in machine and equipment** to better work on the project also remotely. Thirdly, the team envisages a further development of the application in terms of being more **accessible for disabled people**, in particular individuals with visual or auditive impairment, offering the tool in **multiple languages**, as well as exporting yearly reports and parameters focused on youth. Furthermore, the team would like to explore the possibility of:

- integrating an (AI)-powered chatbot to guide young people through public procurement,
- aligning with existing eProcurement platforms.

Finally, based on the **funding opportunities** explored, including those coming from the EU and international institutions, YouthPOP team might be enlarged to include two more Software Developers, one COO, and one data analyst.

Ideally, YouthPOP´s **ambition is to become an indispensable EU-funded platform**, equally helpful for both public and private sectors, focusing on the needs of young people and possibly beyond.

LocalFocus: enabling journalists to create visualisations with open data sources

LocalFocus in a nutshell:

- **Service:** LocalFocus curates newsworthy data for journalists, provides easy data visualisation tools and performs their own analysis that can be used in journalistic articles
- **Sector:** media
- **Country of origin:** the Netherlands
- **Data sources:** open data from national journalistic sources
- **Number of employees:** 160 within ANP, of which 10 work on LocalFocus
- **Website:** www.localfocus.nl

LocalFocus, part of the Dutch Press Agency ANP, an **online platform that provides data and data visualisation tools to journalists**. LocalFocus collects and analyses datasets on a wide variety of topics, providing both regional and national newspapers the ability to transform raw data into visual stories. The platform enables journalists (and non-journalists) to tell data-driven stories, without the need for technical skills.

What services does Local Focus offer?

LocalFocus is an organisation for data journalism founded in 2012. The company's goal is to help journalists make better use of data, as many journalists still lack the data skills (or simply don't have the time) to find the right datasets, analyse the data and visualise the data for their news pieces. LocalFocus offers three services to make the work of journalists better and easier:

- LocalFocus enriches articles published by the newsroom of ANP with interactive maps and chart based on datasets from different sources. In some cases, the data is also enriched to increase its usability. They choose the most relevant datasets so that journalists don't have to wade through different websites and platforms.
- LocalFocus has a Software-as-a-Service platform where data can be uploaded and then visualised. LocalFocus creates a template for its customers, so that journalists and other users can print graphs and maps in the style of their medium. The idea is simple: the user uploads data (e.g. from Excel) and all formatting is done by LocalFocus. This platform is not only used by journalists, but also numerous other users such as analysts in the financial sector who create visualisations for their trend analyses.
- Lastly, **LocalFocus produces between five and eight investigations with visualisations per week**, based on their own analyses. Examples of this are articles about the newly build homes per city; the number of Ukrainian refugees registered per municipality; or simply the percentage of men and women in different regions in Europe (see Figure 4). These analyses are then used by newspapers and other media in their articles.

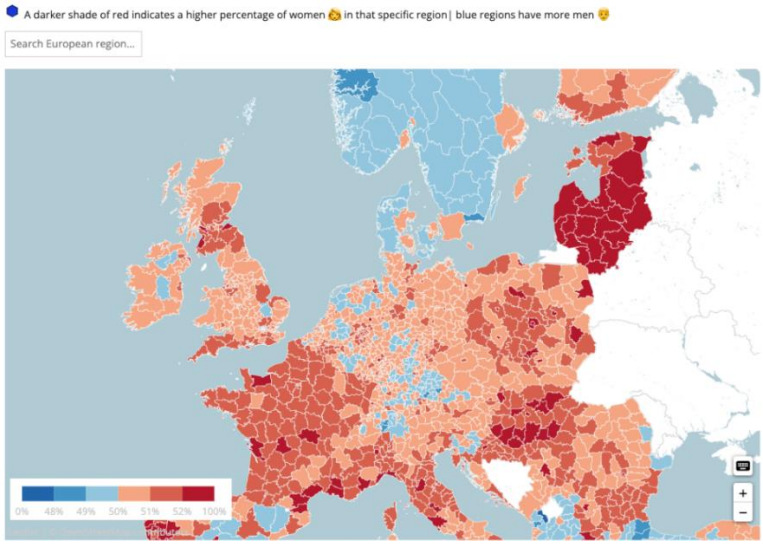
What data does LocalFocus use?

LocalFocus offers journalists a selection of datasets which they think are relevant. The majority of the data is open data. To name a few of their data sources: the Dutch Central Bureau of Statistics (CBS)

provides data about the number of inhabitants per municipality and the Employees Insurance Agency (UWV) provides the number of citizens that are currently unemployed. Also, **more niche open datasets are presented by LocalFocus such as datasets on lost pets or the most popular beer brand per municipality**, just as datasets that allow cross-border comparisons provided by Eurostat.

In some cases, the data are enriched by LocalFocus, or a certain clustering is already done (e.g. to group statistics by region or city). LocalFocus always provides a link is to the source data and a step-by-step process description is given whenever data were enriched or analysed by LocalFocus before publication on their platform.

Figure 4. Map of Europe created by Local Focus that shows the percentage of women and men in each region in Europe, made with Eurostat data



How does Local Focus realise impact?

Thanks to LocalFocus, citizens can be better informed by journalists. A large part of Dutch media organisations uses LocalFocus for their visualisations and they are also growing in Belgium. The number of times the productions are viewed by the media can fluctuate greatly. **In the beginning of the corona crisis, their charts and maps were viewed almost 250 million times a month, but nowadays they are usually viewed between 50 and 100 million times**. In addition, the articles based on research by LocalFocus are copied hundreds of times a month by various national and regional media in the Netherlands.

Feedback is collected through informal means: clients can always call if there are any questions about the platform or the investigations. LocalFocus also helps journalists by actively thinking along about what kind of analysis can be done with certain datasets.

In the beginning of 2022, LocalFocus was incorporated by a large Dutch press agency het Algemeen Nederlands Persbureau (ANP). As part of the ANP, LocalFocus wants to look abroad more often and work together with international press agencies. Technically, the LocalFocus concept is easily scalable to other countries, but the challenge is to find people with the right expertise who can select and enrich the most relevant datasets available in that country.

Naar Jobs in West-Vlaanderen (To Jobs in West-Flanders): finding jobs near you

To Jobs in West-Flanders in a nutshell:

- **Service:** To Jobs in West-Flanders helps people find jobs near them and lets users select whether they will travel by bike, car or train (or a multi-modal combination). The app also provides information on the transport options provided by employers to new employees.
- **Sector:** economy, job market
- **Country of origin:** Belgium
- **Data sources:** open data from national data portals (e.g.,vacancy texts, company data)
- **Number of employees:** 5
- **Website:** naarjobsinwestvlaanderen.be

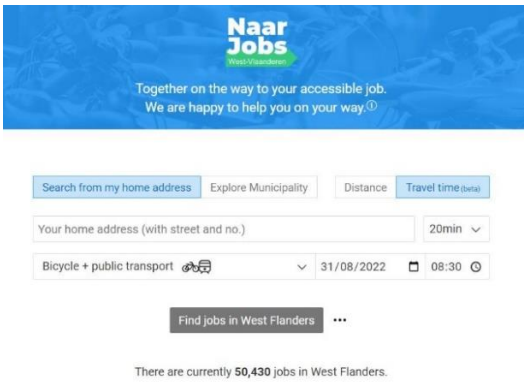
Naar Jobs in West-Vlaanderen (To Jobs in West-Flanders) **helps Belgian citizens to find jobs that are suitable to the transport options available to them**. The goal is to help more people find a job and to help companies fill their open spots. Vacancy data is enriched with precise employment sites, enabling social workers to find jobs for the unemployed that suit their transport options.

What services does *To Jobs in West-Flanders* offer?

Nazka Mapps is a Belgian geo-ICT company that created To Jobs in West-Flanders to solve "traffic poverty" together with Mobiel21, who are specialised on the social impact that transport has on neighbourhoods. Traffic poverty is caused by insufficient traveling options to find a job. Some jobs might be too far away for people, or too expensive to get to. Especially groups that cannot afford a car are at risk of traffic poverty. To Jobs in West-Flanders is part of a broader program, which could in theory deliver the "To Jobs" application to the whole of Flanders (naarjobs.be). The To Jobs in West-Flanders website is funded by POMWVL and the regional department of Flemish Employment Service (VDAB) West-Flanders.

To Jobs in West-Flanders combines **vacancy-data with company data such as their precise employment sites and transport options (and benefits) they offer to employees**. By combining the address of the person looking for a job and the precise location and transport option for employees, To Jobs in West-Flanders is able to provide an overview of all jobs available within a certain traveling time with a certain mode of transportation (e.g., 60 minutes by public transport).

Figure 5. On To Jobs in West-Flanders users can enter their address, transport options and maximum travel time



The app has three main audiences. The first and foremost being social workers that help unemployed people to find a new job. **Social workers actively use the website during one-on-one conversations with people looking for jobs to find a suitable and reachable job together**. The second group are the unemployed persons themselves. The reason the main focus lies with social workers and not the people looking for a job directly is that some people might not be as digitally skilled as others, or do not speak Dutch, making the website hard to use. The last group are the employers, who can increase the chances of finding competent personnel by sharing accurate data about their location and transport options or benefits they have to offer with To Jobs in West-Flanders.

What data does *To Jobs in West-Flanders* use?

The vacancy data that To Jobs in West Flanders uses can be requested via the VDAB open data portal. All vacancies in Flanders are uploaded to this portal. Often the vacancy provides the address of an employment agency or of one of the main offices of the employer, but not the precise location where the applicant is expected to work. The Belgian Crossroads Bank for Enterprises (VKBO) makes all employment sites per organisation available as open data and **these employment sites are automatically and algorithmically matched to the vacancies by the "To Jobs"-engine.** When To Jobs in West-Flanders is not able to match the vacancy to a precise location in the VKBO data, they create a new company site and link it to the company data.

To Jobs in West-Flanders uses non-open data as well. All companies with more than 100 employees need to report to the Belgian government how many parking spots they have for cars as well as the number of places to park bikes and other similar information on transport options. This data is shared with To Jobs in West-Flanders to enable them to enrich their data. To Jobs in West-Flanders has created an easy online method to add this information for companies with less than 100 employees.

Lastly, open data from Open Street Map and Belgian public transport service providers is used to estimate how much time it takes to reach the employment site. To Jobs has built their own multi-modal routing service combining different transport options.

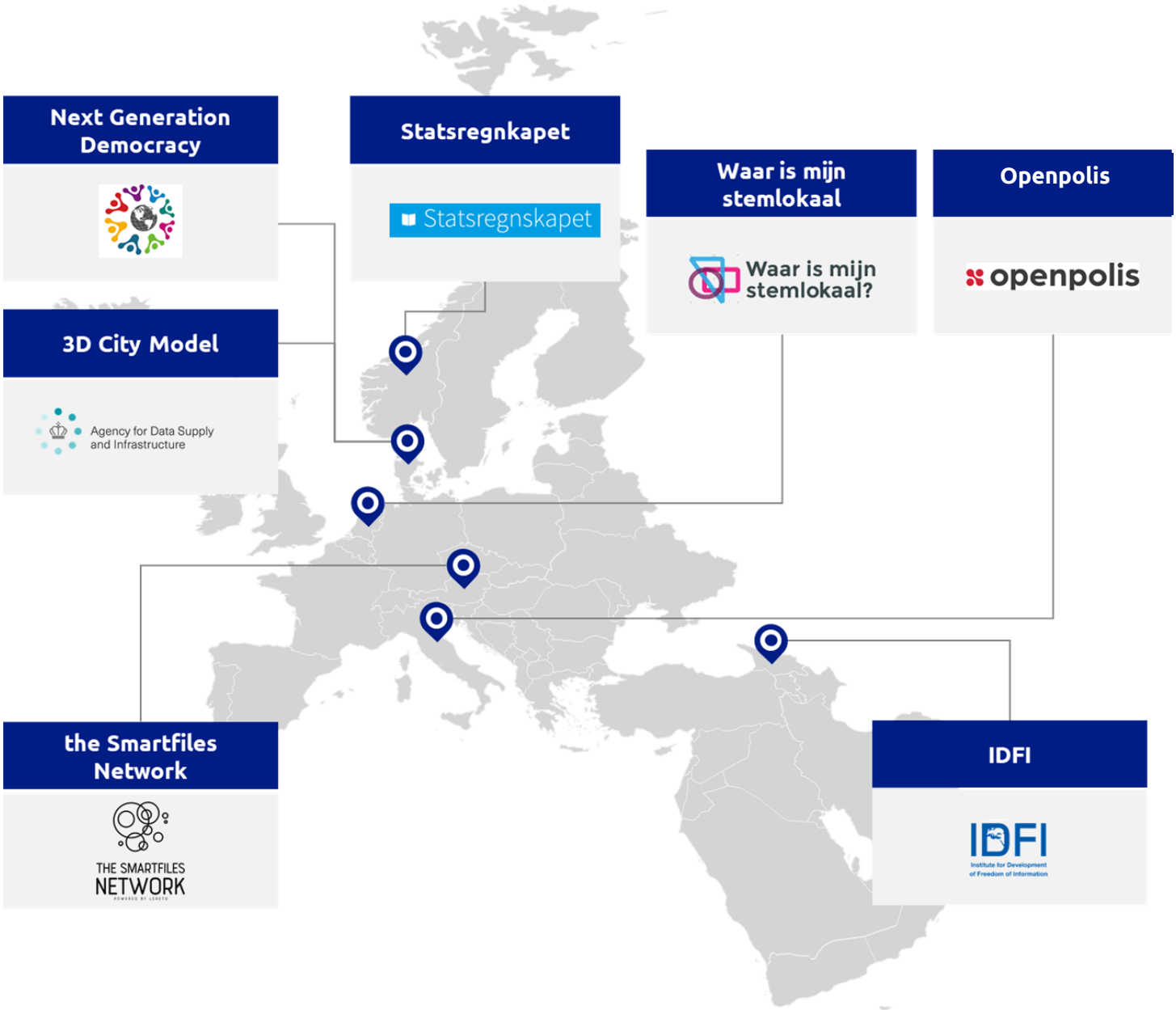
How does *To Jobs in West-Flanders* realise impact?

The website is regularly used by 30 social workers, who are daily responsible for 10 unemployed persons each. The website is also used by other non-recurring users. Currently, To Jobs in West-Flanders does not know how many people are employed because of the use of their website. **The number of companies registered with their initiative increases with 30 per month.**

To Jobs in West-Flanders wants to start a campaign to increase awareness of the initiative both with social workers as well as unemployed persons. This campaign was postponed multiple times, because of the COVID-pandemic. In order to generate more traction, they also want to expand their reach to Flanders first and to the rest of Belgium, the Netherlands and France in a later stage.

Lastly, To Jobs in West-Flanders is looking to integrate new business models. They have created a data API where people can download the enriched vacancy data against a compensation. This would enable other organisations to use the enriched data for their own business ideas.

3.2.Governmental impact



The Smartfiles Network: visualising evolution and interconnectedness of European case law

The Smartfiles Network in a nutshell:

- **Service:** The Smartfiles Network extracts semantics from a PDF text of case law and relies on network analysis methods to visualise the evolution and interconnectedness of the document with other decisions.
- **Sector:** European Case Law, government, justice
- **Country of origin:** Austria
- **Data sources:** open data from EUR-Lex Case Law, EuroVoc, and national case law
- **Number of employees:** 4
- **Website:** smartfiles.lereto.at

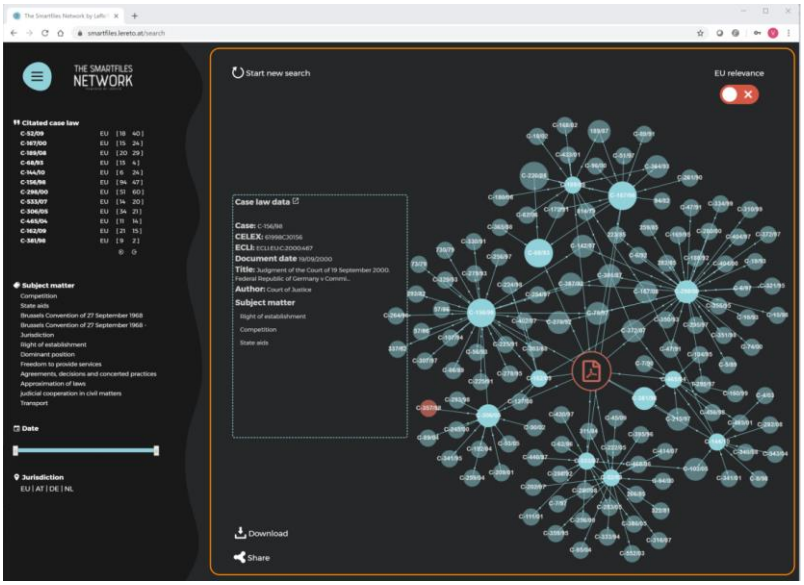
The Smartfiles Network is part of LeReTo, a legal-tech start-up founded in Vienna (Austria) in 2014. Since then, the LeReTo start-up has won several awards, most recently in 2019 at the EU Datathon. On this occasion, Veronika Haberler and Peter Melicharek co-founded the solution The Smartfiles Network, with which they triumphed in the category 'Innovative ideas through EU open data'. Aware of the fact that legal professionals deal every day with thousand pages of PDF texts, Veronika and Peter developed The Smartfiles Network to **simplify legal research and more innovatively visualise case law.**

What service does The Smartfiles Network offer?

The Smartfiles Network relies on an algorithm able to extract the text from a European case law PDF and through recognition logics find the relevant information about the European Case Law Identifier (ECLI) that is used to classify court decisions in Europe. This identifier is necessary for the algorithm to calculate the **in- and outdegree and display these in a real-time citations map**. The indegree is the value representing how many other case law decisions cite the given document, or in other words how relevant the given document is within the EU-Network. The outdegree, on the other hand, refers to the case law fundedness, i.e., how many citations are found within a judgement. The real-time citations map based on these values – the first being variable and the second being constant over time – shows the evolution and interconnectedness of the analysed PDF document, which The Smartfiles Network further **enriches with database links** that enable to click on citations. The citations map can be easily downloaded and shared via social media.

In a nutshell, The Smartfiles Network makes PDFs on European case law interactive and more easily navigable for **legal professionals but more generally for anyone working with research on EU case law** and EU case law decisions. In fact, in the last two years, publishers, content providers, and EU institutions such as the European Parliament have shown an increased interest for The Smartfiles Network as a new way of interacting with legal text and legislative procedures. The Smartfiles Network team was ultimately invited to the European Court of Justice in January 2020 to present the project and the idea of document-based search.

Figure 6. Citations´ map



What data does The Smartfiles Network use?

The Smartfiles Network would not be able to work and **calculate in- and out- degrees without open data**. Moreover, in the legal domain, it is necessary to work with open data across Europe. To build the algorithm, The Smartfiles Network team relied on EU level open data from EUR-Lex Case Law and EuroVoc, cite-scraping the PDF files and further metadata (ECLI and Case Number, URL, Subject matters dates). As regards national data, the team also gathered information from the Austrian public legal database, the RIS (Rechtsinformationssystem des Bundes) and conducted a pre-check of data from the Rechtsprechung im Internet in Germany and De Rechtspraak in the Netherlands. The team had to build their own database for the in- and outdegree calculation and clean the data for citations to account for the fact that it is not common everywhere to use the ECLI when citing EU law: In Austria, but also in Germany, it happens more often to use the Case Number.

How does The Smartfiles Network realise impact?

Since the victory at the EU Datathon 2019, The Smartfiles Network has not been tracking its number of users, but there are different qualitative proofs of the interest that the tool has awakened among various stakeholders. With interactive visualisations, The Smartfiles Network is not only **revolutionising the world of PDFs but is most importantly making legal texts easier to grasp**, simplifying the work of legal professionals, researchers, and policymakers, while potentially also **improved the access of European citizens to key court decisions**.

While the Covid-19 pandemic represented a slowdown in the development of The Smartfiles Network, the ambition of the team is to foster the impact of this open data re-use case by **integrating the measure of relevance in LeReTo´s core technology**. Moreover, the team has also the intention to refine the algorithm by **aligning their definitions of indegree and outdegree to the papers and recommendations of Marc van Opijnen**, advisor legal informatics at the Publications Office of the Netherlands and leading mind behind the ECLI. Finally, the team will work on an upgrade of The Smartfiles Network website application.

3D City Model: making future decisions based on a realistic 3D representation of Aarhus

3D City Model in a nutshell:

- **Service:** The object-based city model is a 3D-presentation of Aarhus that can be used for climate adaptation, green conversion, urban planning, land management and much more.
- **Sector:** government
- **Country of origin:** Denmark
- **Data sources:** open geodata from Geo Denmark
- **Number of employees:** 3
- **Website:** dataforsyningen.dk

Lifelike digital 3D models of urban environments have long been part of computer games, but there is much greater potential in the use of 3D city models. The Agency of Data Supply and Infrastructure and the municipality of Aarhus have developed a **prototype of the entire municipality of Aarhus to investigate what is possible with a modern object-based 3D city model** (the visualisation contain one tile of 1 km^2).

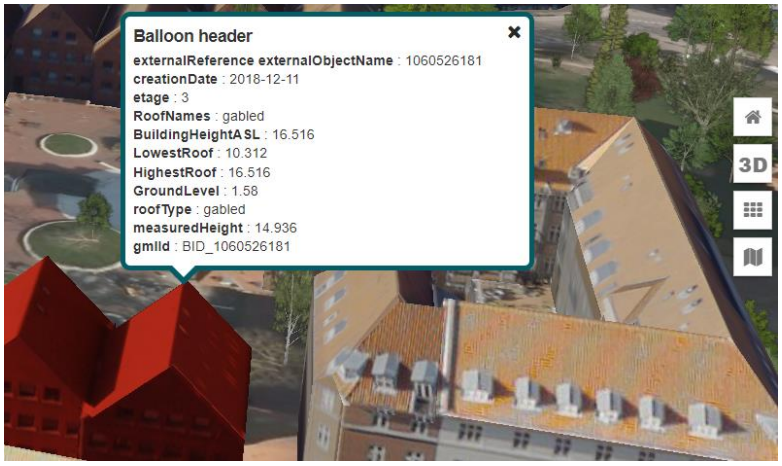
What services does the 3D city model offer?

The use of 3D city models as a communication tool between citizens and public administrations is obvious, for example in consultation processes on new urban development projects.

The 3D city model can be used as a tool of analysis, visualisation, and communication for multiple purposes. For instance, the model can provide **climate adaptation simulations of flooding risk after heavy rainfall** in the city or help find the right location for clean energy sources such as windmills and solar panels. Because of the object-based data, the model shows which roofs obtain the most sunlight and which locations are optimal for windmills.

The Agency of Data Supply and Infrastructure has developed an **object-based version of a 3D city model for Aarhus**. Object-based modelling means that each building constitutes a separate object with a unique ID associated with it. Thus, when you hover over a building with your mouse in a 3D map you can find specific information on a given building such as the height, the numbers of floors and the roof type (e.g., flat, gabled or shed). The figure below shows the information that pops up for each building.

Figure 7. Screenshot taken from the 3D city model with information about the selected building (in red)



The 3D city model also provides benefits to the private sector, such as information about facade renovation, window cleaning and many real estate related matters.

What data does 3D city model use?

The city model pilot in Aarhus uses geo data from Geo Denmark as its main source and this data is openly available. Data from Denmark Footprints is used for the energy consumption of buildings and data from Pointcloud is used to get the height of a building. These data sources are connected via the object IDs of the buildings on the map.

The SDFE has outsourced the visualisation of the 3D-map to Burec (Building Reconstruction) and Terrasolid. They use the (mostly open) data to generate the buildings on the map.

A challenge for the 3D city model can be that the **models are based on disparate data of varying ages, data formats and standards**. This can complicate analyses that cross municipal boundaries, for example if the model is to be used to map the location of a new railway line or where and how much a river overflows its banks during periods of heavy rainfall.

How does the 3D city model realise impact?

The long-term goal for the SDFE is to create a nation-wide 3D-map, but as of yet a lot of work still needs to be done. Today, **about 25% of the country's municipalities use local 3D city models**. Interest in 3D city models among municipalities is high but setting up and maintaining 3D city models is costly. The Aarhus 3D city model is one of the few that is maintained well and open to users.

Feedback is collected via two ways, the first being the feedback option on the website of the prototype where users regular submit their comments. The SDFE also receives feedback from the municipalities they are working for. This enables them to tweak to model for both citizens as well as local governments.

The current impact of the Aarhus 3D-city model is limited, given that the project is currently still a prototype. **Upscaling both in size and in impact depends for a large part on the funding** the team at SDFE is able to get. The funding can be provided by the government (as part of Denmark's digital strategy), but also options for private sector funding are kept open.

Waar is mijn stemlokaal (*Where is my polling station*): making voting easy and inclusive for everyone

Where is my polling station in a nutshell:

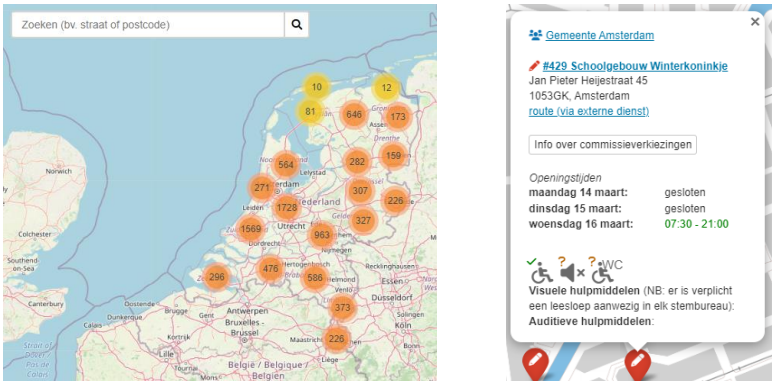
- **Service:** *Where is my polling station* platform helps users find a suitable polling station near them. Citizens can also find information about opening times and whether the polling stations are usable for people with certain disabilities.
- **Sector:** non-for-profit, government
- **Country of origin:** the Netherlands
- **Data sources:** open data from national polling stations
- **Number of employees:** 5-10
- **Website:** waarismijnstemlokaal.nl

The platform Waar is mijn stemlokaal? (*Where is my polling station*) is created and maintained by the Open State Foundation, a non-profit organisation whose mission is to open up public sector information as open data and making it accessible for re-users believing it strengthens democracy and creates substantial civic and economic value. Other open data initiatives from the Open State Foundation focus on lobbying transparency and public spending. The *Where is my polling station* website **lets citizens locate their nearest voting booth** on a map and allows to filter on several accessibility criteria.

What services does *Where is my polling station* offer?

Over 13 million Dutch citizens were allowed to vote in the municipal elections from 2022. In 334 municipalities, voters may go to the polls. But where can they vote? The *Where is my polling station* application **helps citizens find a polling station that suits their needs**. The website lets users search on distance to their home and opening times. Moreover, the website offers special information for people with special needs, such as citizens in a wheelchair or people visually or hearing imparities. The website informs citizens for instance about whether the polling station is accessible by wheelchairs, whether there are disabled toilets and about the acoustic. Polling stations in the Netherlands are obliged by law to have magnifying glasses available.

Figure 8. On the left - overview of all polling stations in the Netherlands. On the right - information about one specific polling station



The main audience of the *Where is my polling station* website are of course citizens looking for a place to vote, but this is not the only group of users. The website also serves as the **main platform to find information about the votes per polling station**. In other words: if you want to understand the Dutch election at a granular level per polling station, then the *Where is my polling station* website has the most accurate information. The platform also offers all data in bulk. Journalists therefore also regularly use the bulk data from *Where is my polling station* to support their news articles.

What data does *Where is my polling station* use?

The Open State Foundation does not use non-open data and publishes all data they use. The website first started by collecting information about polling station themselves from the websites from local governments, which suffered from many data inequalities. To solve this issue, they created a harmonised data standard and asked all municipalities to upload their data on the website in the standardised format. Currently, 82% of municipalities follow the standard created by the Open State Foundation, which means that for 18% of the municipalities the data still needs to be collected manually.

The *Where is my polling station* website uses open cadastral data, geo data from Open Street Map and specific information about buildings with Bag ID (base registry for addresses and buildings) to further complement the data from the municipalities.

How does *Where is my polling station* realise impact?

During the 2022 elections the website was visited by **500.000 unique users**, who remained an average of about 1 minute of the website. For the 20201 parliamentary elections this number was even higher, **reaching 700,000 unique visitors**.

The data is also regularly used in the media. The Dutch Broadcast Foundation, for instance, drew the attention to some polling stations that opened earlier, to give people at-risk for COVID to vote at a safer time and place. A large Dutch newspaper also used the data to visualise the vote share of political parties per municipality. Everyone can find how the votes cast in their polling station were distributed.

The website is constantly **being updated and improved based on user feedback**. Especially during elections, they receive a lot of feedback from users on their website. They also set up **research groups to better understand the needs of people with disabilities**. For the near future the goal for Open State Foundation is to secure long-term funding, so that they can keep improving the completeness of information and the user friendliness of the website. For municipalities to provide the data as for user to access the data.

Openpolis: The Italian foundation that narrates political power with open data

Openpolis in a nutshell:

- **Service:** Openpolis gathers, analyses, and uses open data to explain political power in Italy.
- **Sector:** non-for-profit, government
- **Country of origin:** Italy
- **Data sources:** open and non-public data from national government entities
- **Number of employees:** 15
- **Website:** www.openpolis.it

Started in the 2000s as a simple association, the Italian foundation Openpolis was official launched in 2018 with the aim of making data available for re-use to the greatest possible number of citizens. Since then, Openpolis has not only focused on the **technical aspect of providing open data, but also on narrating this data**, affirming itself in the area of 'data journalism' as well. Openpolis has accumulated a consistent number of datasets that are regularly updated and used for a series of different projects, all focused on **making socio-economic and political transformations in Italy more transparent**.

What services does Openpolis offer?

Openpolis offers a variety of different services to its audience, which ranges from students and journalists to institutions and administrators:

- Web applications based on open data, such as **Open Parlamento** that monitors almost in real-time the activity of the Italian Parliament based on data retrieved from the Italian House of Representatives and the Senate of the Republic;
- Online platforms, among which **Centri d´Italia**, developed in collaboration with Action Aid. The platform maps out - through a user-friendly and freely accessible website built on data from the Italian Ministry of the Interior - all reception centres for refugees and asylum seekers in Italy;
- Initiatives like **Open bilanci**, which offers to citizens a direct access to the balance sheets of Italian municipalities;
- Personalised information as in the case of **Open PNNR**. Based on the data of the Italian Ministry of the Economy, the platform informs subscribers about the latest developments in the implementation of the Italian Recovery and Resilience Plan through regular e-mail updates and catchy visualisations;
- Further projects, including **Mappe di potere**, which gathers data related to Italian politicians and connects it with data on central administrations (e.g., ministries, constitutional entities etc.) and data on the Italian economy (e.g., public and private companies´ data). The aim is to trace properties, shares, and understand the multiple roles that politicians and administrators might have.

Each of these initiatives and datasets contribute to Openpolis´ content creation published on the magazine Openpolis.it and on the related newsletter. This year, Openpolis has also founded its own

membership programme, with the aim of increasing its audience, further engaging the existing community in Openpolis activities, and contributing to the **financial – and political- independence** of the foundation**.**

Figure 9. Openpolis´ range of activities

What data does Openpolis use?

The idea of Openpolis is rooted in the belief that data is key for our society and needs to be used for the greater good, i.e., to increase people´s awareness and participation in democratic processes and decision-making. Not surprisingly, Openpolis has been long **lobbying Italian government entities and administrations to make more of their produced and used data open**. In fact, besides Open Bilanci, which uses data that has been historically open - as required by the Italian law -, many other initiatives of the foundation make use of data that was often – not always - obtained through **Freedom of Information Act procedures.** Hence, a big effort is done not only to clean, refine, analyse data and create with it content, but also to exert pressure on administrators in Italian ministries, governmental agencies, and municipalities to make this data openly accessible.

How does Openpolis realise impact?

By contributing to the publication of public institutions´ data in Italy, Openpolis has a clear impact on the state of open data in the country. By using this open data, the foundation also seems to be reaching to an increasing number of users, in alignment with its goal of making data available and re-usable for as many citizens as possible. For example, the project Open PNRR counts **1600 subscribers**, among which institutions, associations, companies, regional and local administrations, as well as single citizens. The newsletter, on the other hand, has **between 80 000 and 90 000 subscribers**.

Beyond the Italian reality, Openpolis is following closely what is happening at European level. To contribute to the EU goal of overcoming data silos and foster data sharing, **Openpolis is working on gathering in one single point of access the data of public institutions**, as well as private and public companies in Italy, especially at local level. As set out in the Data Governance Act, Openpolis would like to pursue the logic of **data altruism**, unlocking the potential of open data not only through a top-down, but also as a bottom-up approach.

Next Generation Democracy: The Danish NGO that uses open data to improve democracy

Next Generation Democracy in a nutshell:

- **Service:** Next Generation Democracy offers activities and data-driven solutions to improve democracy and raise awareness on a use of technology that benefits all.
- **Sector:** non-for-profit, government
- **Country of origin:** Denmark
- **Data sources:** open data from EU institutions
- **Number of employees:** 2-6
- **Website:** nextgenerationdemocracy.com

Next Generation Democracy is an NGO based in Denmark whose goal is to **raise awareness and drive change by leveraging data and new technologies to achieve a democracy that works for all.** To this aim, the NGO organises workshops and interviews with global thought leaders and identify like-minded organisations and opportunities to use technology for the greater good. Next Generation Democracy´s initiatives includes **The Future Readiness Index**, the solution with which Michael B. Jensen (co-founder of Next Generation Democracy) and Kristian T. Madsen (Member of Next Generation Democracy) won the 2020 EU Datathon´s category ´A new push for European democracy`. The prototype they developed enables citizens to follow the work of Members of the European Parliament (MEPs) and engage directly with them.

What services does Next Generation Democracy offer?

How can technology help avoid some of the challenges of democratic processes? With this question in mind, Next Generation Democracy performs different activities, among which keeping a global **democracy-technology database**, with all great initiatives, ideas and organisations within the democracy and technology ecosystem. Moreover, the NGO organises **workshop sessions on topics at the crossroad of digital and politics** - such as AI for democracy or predicting policing – and interviews global thought leaders in the field. Finally, Next Generation Democracy identifies opportunities to **leverage technology for the betterment of society** and tests them through simple experiments.

One of these experiments is **The Future Readiness Index**. Based on data about MEPs´ amendments, the web application **categorises politicians along 450 different topics and ranks their work according to the future relevance of the topics treated.** For example, green energy or AI legislation are topics that would make an MEP score high, while coal power plants would receive a low score. The Index does not consider the view of the given politician on the specific topic, but rather ranks them based on how much time the politician spent on a certain topic: the larger the amount spent on green energy, the higher the score of that politician[4]. Conversely, the more time is used for coal power plants, the lower the scoring. When using The Future Readiness Index, users are able to see the ranking by political group, individual MEP, or country. For each MEP, information on nationality, political affiliation, as well as their ´fingerprint` are provided. The fingerprint icon on the web application shows a word cloud that

[4] Information on how the Index is constructed is open for feedback and can be found in the section ´above` of the web application.

summarises the main topics of interest for the given MEP. By clicking on the Twitter icon, on the other hand, users are directed to the social media page of the given MEP and by clicking on the e-mail icon, they can directly write to them. Below this information, the web application offers users the possibility to read through the various activities that the consulted MEP is involved in, with their respective score.

Figure 10. Interface of The Future Readiness Index and an example of MEP´s ´fingerprint

What data does Next Generation Democracy use?

To build The Readiness Index, the Next Generation Democracy team used **open data from the European Parliament and more precisely data on amendments in which MEPs** were involved. Since they needed data that could indicate individual behavioural tendencies, the team also considered using voting data. Yet, given MEPs often vote on blocks - i.e., along political affiliations - the team decided to exclude this kind of data. Another Data sources that was taken into account is recordings of legislative procedures and transcriptions of discussions that could allow to perform a sentimental analysis. This data, however, was too complicated to properly use within the timeframe of the EU Datathon competition. To perform the textual analysis and web-scraping of the amendments´ data based on the word list of EU topics, Next Generation Democracy firstly considered going directly to the source and use APIs from the European Parliament. Yet, because of the inaccessibility and bad quality of some of this data, the team decided to appoint an intermediary.

How does Next Generation Democracy realise impact?

The EU Datathon in 2020 was a huge motivator for Next Generation Democracy. Yet, **scaling their Future Readiness Index following the win was not as easy** as expected. Due to the loss of data and related analytics on the side of the intermediary, the team was not able to update the Index prototype for more than six months. When the data was finally retrieved again, the team was able to re-construct the demo version of the Index – i.e., the one based on data from 2020 – but the time wasted, and the few financial possibilities did not allow to advance much further. The inconvenience with the data led to a momentum loss and to a cut in team members. This altogether challenged Next Generation Democracy´s ambition to scale up the solution and engage more users.

Despite this, the Danish NGO has continued having an impact on democracy and society through its other services and keeps on looking positively to the future of the Index. In fact, besides the success gathered at the EU Datathon, the ranking solution has been **attracting attention at various other events** – most recently at the Copenhagen Democracy Summit – and among MEPs themselves, who could use the tool to more easily find and collaborate with like-minded colleagues.

Looking ahead, Next Generation Democracy team would like to **raise further financial resources** – through a partner or a foundation - to build up a team around the Future Readiness Index and scale up the prototype by increasing user engagement. They also envisage to **upgrade the Index** to perform more tailored rankings and to extend the tool at local level.

Statsregnskapet.no: helping citizens understand how the government uses taxes and public revenues

Statsregnskapet.no in a nutshell:

- **Service:** Statsregnskapet.no is a website that visualises government income and spending to facilitate transparency and enable the public to find information about the central government accounts.
- **Sector:** government
- **Country of origin:** Norway
- **Data sources:** open data from government agencies (e.g., income, expenditures/costs, Work-Year/Full-Time Equivalents)
- **Number of employees:** 5 persons within the Government Agency for Public and Financial Management (DFØ) work part-time on statsregnskapet.no (2 FTE)
- **Website:** Statsregnskapet.no

Transparency is a prerequisite for accountability. Given the size of government income and spending, transparency about where the money comes from, and where it goes, is essential for a well-functioning democracy. Statsregnskapet.no provides an **overview of the Norwegian government`s income and spending** in an easy-to-understand dashboard.

What services does Statsregnskapet.no offer?

Statsregnskapet.no is run by Government Agency for Public and Financial Management (DFØ) and **presents accounting data, mostly cash accounting data, but also accruals accounting data for some government agencies** (companies), appropriations data, and FTE data in several views. The user can view graphic presentations of income and spending at government and ministry (department) level, as well as income and expenditures or costs and FTE information for government agencies. The user can also compare development of appropriations and expenditures data monthly, per item, chapter, programme category and programme area. The 'About state (central government) accounts' page includes stories, definitions, and other relevant information to enable users to understand and make good use of information on the website. A comparison page makes it very easy to compare accounting data, key financial indicators, and several indicators for different expenditures or costs per FTE at agency level over time, and across agencies.

Figure 11. Screenshot taken from the (translated) statsregnskapet.no website

Statsregnskapet.no has a very broad audience. Simply put, anyone with an interest in Norwegian public administration is the target audience, which includes ordinary citizens, politicians, media, academia, special interest groups, the Office of the Auditor General, consultants, students, leaders, and employees in government agencies as well as the private sector. In short: **Statsregnskapet.no is a unique source of knowledge for anyone interested in Norwegian public administration.**

What data does Statsregnskapet.no use?

Most data on statsregnskapet.no is open data. The annual reports from government agencies, including annual accounts and FTE data, are published on the respective websites of the government agencies. Appropriations data is available via the government's own web page Regjeringen.no.

The monthly accounting data presented on statsregnskapet.no is originally not open data. **DFØ receives the accounting data reported by the government agencies monthly and performs some validation controls before making the data accessible** as open data on statsregnskapet.no and on dfo.no for others to use.

Cleansing and structuring of data is done in procedures available through database/SQL tools. Statsregnskapet.no does not manipulate or change any data, but some key figures are put together from more than one data source (for example key indicators such as 'salary per FTE').

How does Statsregnskapet.no realise impact?

DFØ monitors the use of statsregnskapet.no on a regular basis. However, since the website is an entirely open solution without any form of log-in required, visitors are not individually identifiable. Using a web analytics program, DFØ measures the number of visits (**15500 annual average 2018-2021**), the number of new and previous visits, average visit duration, the number of actions per visit, and a range of other indicators that provide information about how and how often the website is being used. DFØ uses this as input for marketing initiatives, competence measures and reporting.

DFØ seeks to promote statsregnskapet.no on a regular basis, typically when new annual data is presented on the website, when significant improvements are implemented, or new types of data are made available for users. In recent years, to create awareness of and stimulate interest in the solution, DFØ has been more active and experimenting with a mix of **blogs, short videos, articles on social media, newsletters to government agencies, and conducting webinars**. These activities compliment the conducting of courses and workshops for journalists, government agencies, the Office of the Auditor General, and others. Course feedback and user-surveys indicate that statsregnskapet.no is both useful and user-friendly.

In the coming years, DFØ will continue to develop the website and proceed efforts to **increase the use and utility of statsregnskapet.no.** Moreover, in August 2021, the Norwegian Ministry of Finance decided that accruals accounting principles should become mandatory and implemented for all government agencies within a five-year period. Therefore, a main goal the coming years will be to **enable reception and presentation of accrual accounting data for all government agencies** in statsregnskapet.no.

IDFI: making closed or inaccessible public sector data available in formats that are easy to use

IDFI in a nutshell:

- **Service:** IDFI makes governmental data openly available for users on its open data portal, and evaluates the transparency of Georgia's government institutions and
- **Sector:** government
- **Country of origin:** Georgia
- **Data sources:** open and non-public data from government bodies
- **Number of employees:** 30 (of which 7 work on activities of access to open data and supporting journalists
- **Website:** idfi.ge

The Institute for Development of Freedom of Information (IDFI) **obtains large amounts of data from public institutions in PDF format and publishes it in machine-readable formats** on an online data portal. Examples of data that IDFI published regard access to legal information, court decisions and open parliamentary data. IDFI also provide yearly rankings of the transparency of government institutions in Georgia.

What services does IDFI offer?

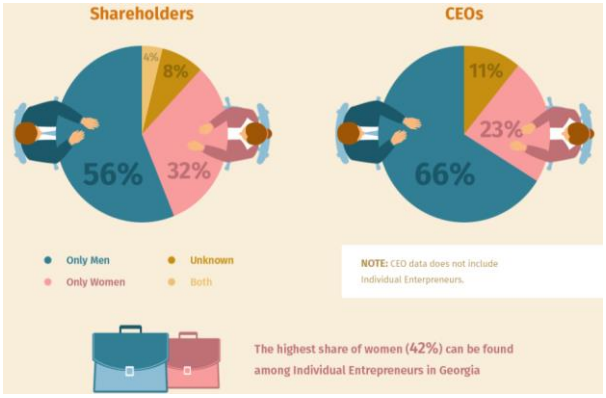
IDFI was established in 2009 and has three main strategic goals:

- Encourage an Informed Public by expanding the public's access to information
- Improve the Quality of Democratic Governance by building open, accountable and responsive national & local governments
- Invest in a More Equitable Society by promoting policies and practices demonstrated to build political, social & economic equity and improve overall well-being.

Especially for the first two goals, open data and opening up data is a prerequisite for success.

With the help of international donors, such as the Visegrad Fund and the Netherlands, **IDFI created their own open data portal, datalab.ge**. On this portal users can find around 1400 governmental datasets, almost all available in Excel and CSV. Moreover, the website offers a toolkit to use the data and visualisations of the data made by the IDFI team and IDFI organises annual contests for open data users to create awareness about the opportunities that open data offers.

Figure 12. Data visualisation made by IDFI based on open data from their portal



IDFI also publishes a yearly report about the transparency of government institutions, in which they check compliancy of the government with Freedom of Information (FOI) requests. The data they collect with this report is subsequently made available to the public. **The report provides a transparency ranking of government institutions**, partly to celebrate ministries that are doing well, but mostly to name and shame those that regularly fail to comply with the request. Moreover, IDFI also advocates for better transparency legislation.

Other activities of the IDFI include advocating for open data standards, to make open data easy to use for everyone in Georgia. Furthermore, IDFI helps stakeholders to get information from the government that is not yet available, and they have a legal aid project for journalists, helping them to go to the court when FOI requests are not granted.

What data does IDFI use?

IDFI uses many open data sources from the government in its open data portal. However, in many instances this data is still in PDF or word format and **IDFI first needs to transform the data into Excel or CSV to make re-use easier**. IDFI uses open-source software for the transformation from word/PDF to Excel/CSV when possible, but often the data still needs to be added to Excel manually. Updating the data after government publish new data also has to be done manually

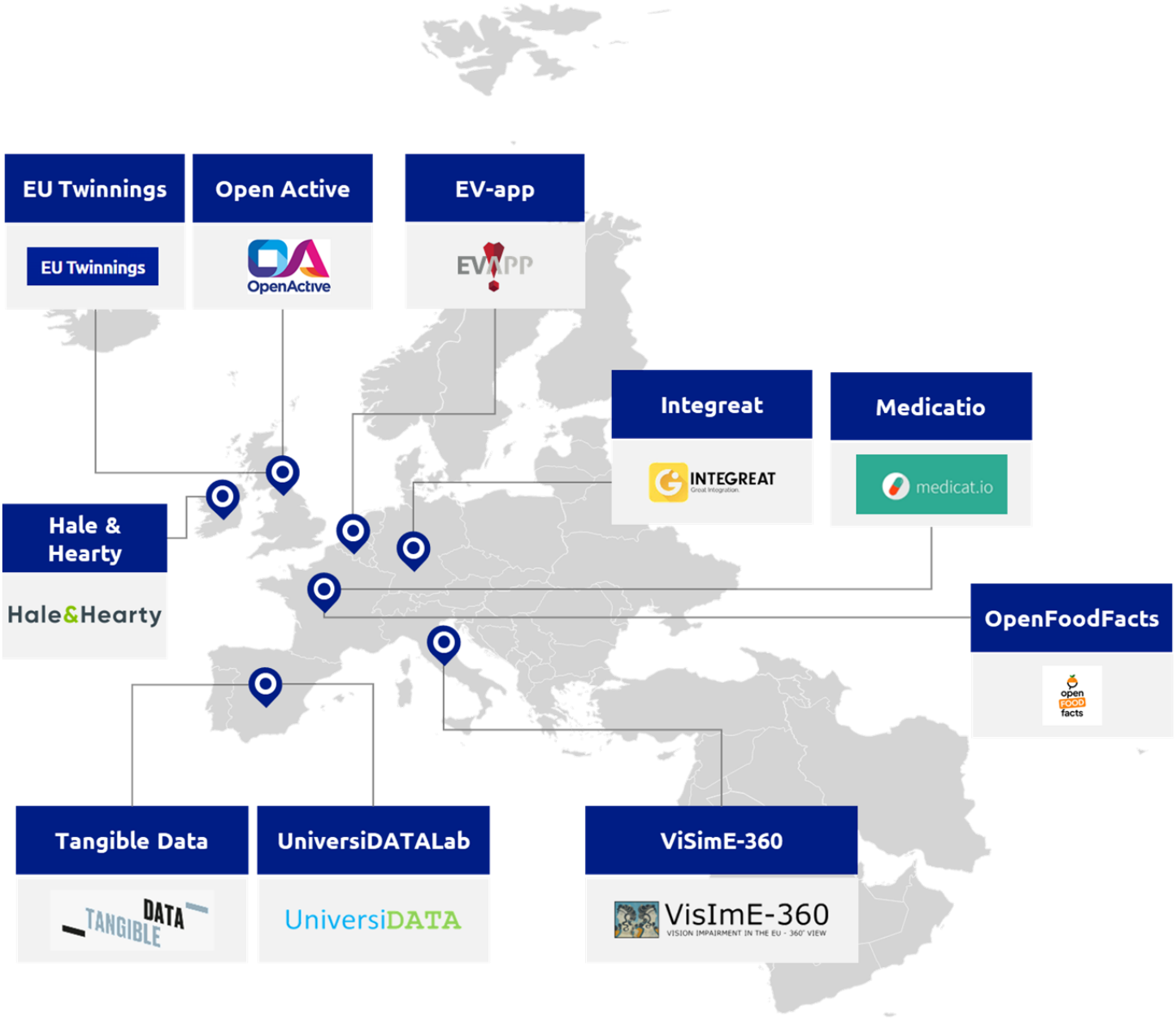
IDFI makes a lot of data available with FOI requests. This data is also often delivered to them in PDF format and then needs to be changed into a machine-readable format.

How does IDFI realise impact?

IDFI's annual report gets lots of media coverage each year and the outcomes are uses by multiple civil society initiatives. Moreover, the top-performing government institutions in the report also write their own articles celebrating their score. **Transparency in Georgian government improved substantially since IDFI started reporting it** in its annual monitor. Although this improvement cannot be contributed fully to IDFI, it is likely that the reports played a role.

IDFI's open data portal has 50 users on a regular day, but recently had over 1000 visitors on a day during their Data for Change challenge, which had as goal to encourage the use open data to prepare analytical articles. 15 articles were published as a result of the contest. For the coming years, IDFI aim to expand the number of datasets available for re-use on the open data portal and to explore whether they can publish data that is currently hold by companies, such as data from hotels to analyse tourism in Georgia.

3.3. Social impact



Medicatio: the open-data-driven app that provides user-friendly information on medicines

Medicatio in a nutshell:

- **Service:** Medicatio publishes data on all available drugs in France to facilitate citizens´ access to medical information and allow health professionals to keep track of legal and commercial changes.
- **Sector:** health
- **Country of origin:** France
- **Data sources:** open data from the European Medicines Agency and national health agencies
- **Number of employees:** 1-2
- **Website:** medicat.io

Medicatio started in 2015 from an idea of the engineer Willy Duville, joined later by the PhD Miwon Seo, who aspired to **mind the informative gap between citizens and governmental authorities releasing information about drugs**. By providing user-friendly information on medicines – including usage and drug interactions -, Medicatio platform impressed the EU Datathon jury of 2018, winning the challenge 'EU open data — For more innovation in Europe'. Since then, Medicatio has continued relying on open data to keep its users updated on the more than 15.000 approved drugs in France and in Europe.

What services does Medicatio offer?

Medicatio applies cutting-edge technology to offer a user-friendly website, where citizens can find free, neutral, up-to-date, and easy to understand **information on all approved drugs in France and in Europe.** The service provided by Medicatio allows people to overcome the sometimes-biased profit intentions of commercial organisations and the heavy jargon of doctors and pharmacists.

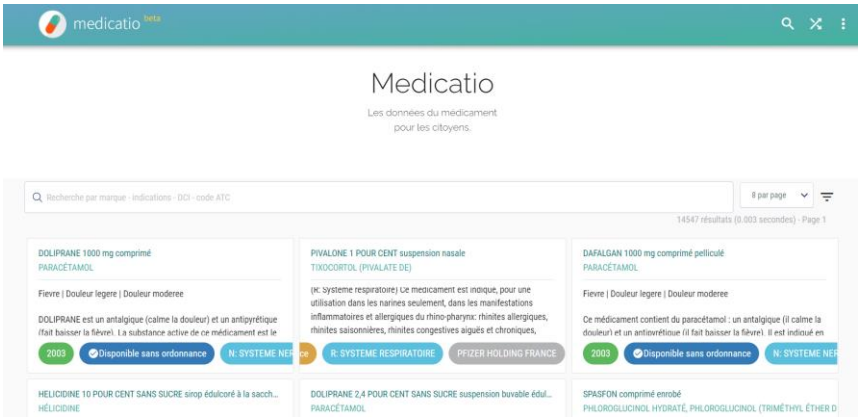
At the same time, with the frequent updates of the numerous approved drugs in France and in Europe, Medicatio represents also a reliable source of information for health professionals, who wish to check the latest changes in the medicines prescribed to patients.

While the main beneficiaries of Medicatio is the general public, the team is considering involving more doctors and health professionals in the uploading and updating of data and recommendations on the specific drugs displayed on the platforms. In fact, for the moment Medicatio only uses officially published open data by medical authorities in France and the EU.

What data does Medicatio use?

The main source of information for Medicatio are the **open datasets** of the Agence National de Sécurité du Médicament (ANSM) and the big database on reimbursement of prescribed drugs - Assurance maladie - of the Autorité de Santé, which provides evaluations, notes, and useful documents on drugs for health professionals. A second important source of information for Medicatio comes from the European Medicine Agency.

Figure 13. Research banner on Medicatio



Currently, the Medicatio team still adds some datasets, but the idea is to make the uploading and updating process as automated as possible. The team has prepared a pipeline of downloaded data from the above sources. After the downloading, however, this data needs to be cleaned to ensure the highest quality of the given information. This is particularly important for data on medicines given that most information retrieved is still hand-typed in a verbose style by health providers and might contain typos – the Medicatio team reported already few mistakes to the responsible authorities. Following quality assurance, all data downloaded and cleaned from the Agence National de Sécurité du Médicament, the Haute Autorité de Santé, and the European Medicine Agency is combined in one single database through a framework based on GraphQL, an open-source data query and manipulation language for APIs.

How does Medicatio realise impact?

Since winning the EU Datathon in 2018, Medicatio has been growing steadily, reaching more and more people, especially in the last months of 2022. In June 2022, the number of the website´s active users ranged between **1000 and 2000 users per day**. This greater outreach is certainly due to Medicatio´s intuitive features and accessibility, which is further amplified by the fact that the team improved the web semantics to make the website easily findable on Google. In other words, when someone searches for the name of a specific drug and some additional key words, they are automatically suggested to visit Medicatio.

The intention to more pro-actively **involve health professionals in the updating of the information** on Medicatio will also allow a greater impact of the platform on the healthcare sector in France and in the EU, for which providing accessible health data is a priority.

In the future, Medicatio would like to **distinguish itself even more from other companies** and platforms providing a similar service and from the sources and software used by them. To this aim, Willy Duville, from the Medicatio team, is **collaborating with the French research laboratory focusing on medical informatics and e-health research** - Laboratoire d´informatique médicale et Ingenierie des connaissances (LIMICS) - to review the existing algorithms and better identify drug-on-drug interactions. The first research paper on this collaboration should be published in 2023, following which the algorithm will be updated on the platform as well.

UniversiDATALab: showcasing the potential of open data for Spanish universities and beyond

UniversiDATALab in a nutshell:

- **Service:** UniversiDATALab is a repository of the analytical applications based on the open data published by the six Spanish universities part of the portal UniversiDATA. Its aim is to transform the static analyses of a portal´ section into dynamic results.
- **Sector:** higher education
- **Country of origin:** Spain
- **Data sources:** open data from different national universities
- **Number of universities involved:** 6 (until July 2022)
- **Website:** www.universidata.es

UniversiDATALab was conceived by the team of UniversiDATA, the open data portal for Spanish universities. The portal went live in December 2020 with the goal of making easier for universities in Spain to publish open data and to support its re-use. As a public-private collaboration initiated by 3 public universities and the company DIMETRICAL, UniversiDATA has recently expanded to include six academic institutions. These not only share one single portal, but also use the same standardisation, harmonization, and publishing schedule of the data produced. UniversiDATA features a series of sections, among which the section ´Laboratory`, seed of UniversiData Lab and main channel through which the UniversiDATA team has **showcased the power of open data for higher education**.

What services does UniversiDATALab offer?

As follow-up to one of the sections of UniversiDATA, the Lab serves as **interactive repository of analytical applications of the open data published on the portal.** The Lab is currently in a ´closed alpha` state, only accessible by members of the project, and will only go live at the end of 2022. The UniversiDATA team is still in discussion with stakeholders to identify the best research content to make available. Yet, a crucial part of the repository will certainly be will certainly be expanded with dynamic versions of the research so far conducted within the scope of UniversiDATA, among which:

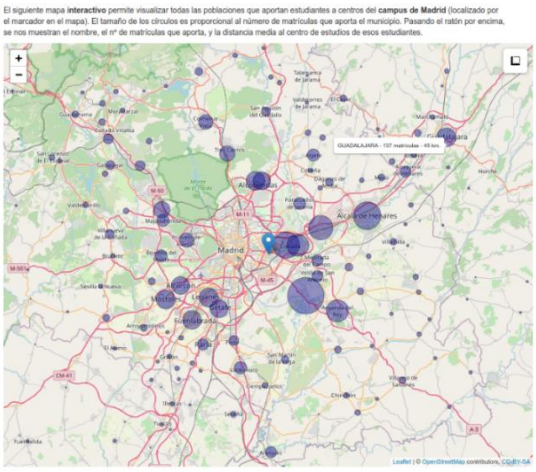
- An analysis of intercity commuting;
- A study on ´teaching-in-breeding`, i.e., how many professors have been students in the same university;
- A retirement analysis to predict how many retirements would happen in a specific year and in which university departments;
- A study on gender differences in enrolment and course performance.

Further examples of open data applications might also draw form the outcomes of the 1st UniversiDATA Datathon that was launched in July 2022.

All the **applications on the repository will be made interactive and open source**. By doing this, the UniversiDATA-Lab wants to materialize the potential value of the data published by universities through analytical applications that provide useful insights into the higher education community and serve as didactical tools of what can be achieved through open data. By leveraging the common semantics, formats, granularity and schedule, the analysis implemented in these applications will also be instantly available to data published by every new university that adheres to the project.

UniversiDATALab aims at being as a source of inspiration and guide for a various audience, including individual students using the data to make informed decisions on their academic path, teachers and researchers using the data as an academic resource, companies taking business decisions, as well as government bodies relying on this data for monitoring and policymaking goals.

Figure 14. Example of interactive map available on UniversiDATA Lab, depicting the hometown, quantity and distance to their campus for studens who need to commute



What data does UniversiDATALab use?

As spin-off of UniversiDATA, the Lab and the here **published analyses will be initially only based on the open data from UniversiDATA.** However, additional open sources may be considered in the future. The data published on UniversiDATA is completely processed using the R Project for Statistical Computing, from the download of the data to its presentation via dynamic tools and graphs. UniversiDATA datasets are published at the finest level of detail, meaning that very large and detailed datasets are analysed and cleaned before this processing happens.

To enable that this process goes smoothly, the UniversiDATA team has an annual schedule, defining when universities should provide them with the standardised data sources. Moreover, the team also has a technical guide on how universities should prepare these standard data sources so that the process of anonymisation and enrichment of data can be automatised and re-used.

How does UniversiDATALab realise impact?

Since UniversiDATA Lab is not live yet, its impact is still difficult to predict. Nonetheless, the team plans to both keep track of the number of visits and to introduce a login-free feedback mechanism as the one already existing on the UniversiDATA portal. In this sense, the positive impact and the potential of the project can already be seen from the numerous comments appreciating the open data applications, which eventually led to the idea of creating the ad-hoc repository.

The greatest ambition of the UniversiDATA team is continuing having an **impact on universities´ production and use of open data** and showing its potential through different applications. More broadly, the team also aspires to provide a useful service to as many collectives as possible and include in the project an **increasing number of Spanish universities**. Several academic institutions have already asked for information and a demo of the Lab: including them in the initiative would **improve also the value, breadth and accuracy of the analyses**.

VisImE-360: the Italy-based app using open data to facilitate health care planning for visual impairment

VisImE-360 in a nutshell:

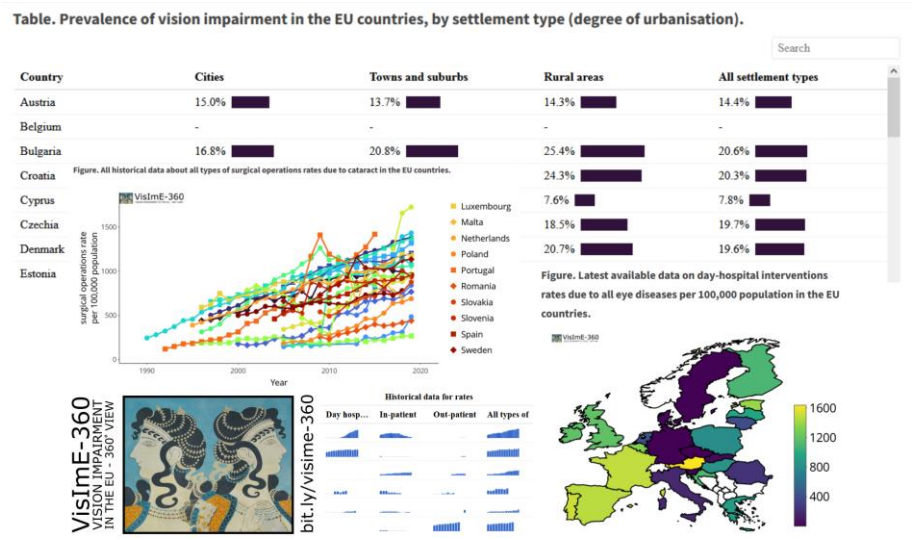
- **Service:** VisImE-360 explains in a single information space the Eurostat´s data on visual impairment, helping to allocate resources for medical aid.
- **Sector:** health
- **Country of origin:** Italy
- **Data sources:** open data from Eurostat and research studies
- **Number of employees:** 1
- **Website:** vision.scientific-tools.org

VisImE-360 was created by the epidemiologist and data scientist Boris Bikbov, driven by the idea to collect in a single information space major data on a single disease. He used raw open Eurostat data to produce easy-to-percept text description, visualisations and tables. The 2021 EU Datathon competition provided the right opportunity for Boris to develop a web application that explains and visualises data on visual impairment in Europe. In this way, **the application ultimately helps decision-makers to allocate resources** for helping people with visual impairment and **facilitate provision of the most appropriate medical aid**.

What services does VisImE-360 offer?

The goal of VisImE-360 is twofold. On the one hand, it **raises awareness about visual impairment**, which is one of the most prevalent health conditions worldwide, affecting an increasing number of people. On the other hand, it **supports a wide range of stakeholders** – including policymakers, patient organisations and people with visual impairment, members of the media and social service workers – **to take action and improve access to prevention and treatment**.

Figure 15. Selected VisImE-360 visualisations



To do so, the application presents the user with two chapters. In the first chapter, it shows the **number of people that suffer from vision impairment** across EU countries and according to the degree of urbanisation (i.e., people living in cities, towns, or rural areas) as well as education (i.e., people with primary, secondary, and tertiary education). This is done through different tables, bar charts, and interactive maps. The second chapter focuses on **healthcare resources and utilisation for vision impairment**, including latest metrics on available ophthalmic surgeons in Europe, up-to-date statistics on surgical operations for cataract treatment across EU Member States, as well as data on day-hospital interventions and hospital discharges for all eye diseases. Dynamic line charts and tables help the user to draw comparisons between various countries in terms of prevalence and treatment patterns and use them to plan public health actions.

To make all this information more accessible to all - including individuals with decreased visual perception, colour vision deficiency or colour blindness - VisImE-360 offers the possibility to select **colour schemes and font features that better suit the user´s needs** and allows **a more comfortable experience**. Written and visual guidelines on how to explore the application and its features are also available.

What data does VisImE-360 use?

VisImE-360 entirely relies on **Eurostat data, scientific research studies, and other open data sources**. To prepare the data and use it effectively for the application, Boris underwent a two-step process using the open-source R computing environment.

Firstly, he **searched through the datasets of Eurostat**. This was quite challenging because initial search indicated almost 300 datasets with topics related to vision impairment and disability. However, only some of them contained information of interest. While some datasets could be filtered based on the complete description, Boris has to manually review about 150 datasets and their dictionaries to find those really containing data on vision impairment. The application was ultimately constructed on 8 datasets.

The second part of the process entailed the **preparation of all visualisations, tables, and figures to better reflect the richness of the open data** retrieved from Eurostat. The major findings are also accompanied by a short text description that partially generated by a data processing algorithm. Importantly, Boris made all information processing and visualisations by reproducible data science pipelines that facilitate their update upon new Eurostat releases in the following years. Through ad-hoc accessibility features and different kinds of graphs, VisImE-360 offers easy-to-percept statistics for everyone.

How does VisImE-360 realise impact?

VisImE-360, which was first released in November 2021, is still up and running and has a development plan. An update of the datasets used is foreseen for this coming autumn and Boris would like to work on receiving financial support to refine the application and increase user engagement. At the moment, no precise analytics is available, but the app newsletter has 15 interested subscribers. At the same time, while no particular feedback was provided via the contact form of the app, VisImE-360 seems to have awakened a strong interest among the jury of the EU Datathon 2021 and its participants.

All in all, the **great benefit of VisImE-360 for visually impaired Europeans and the larger health and policy-making community is certainly clear**, the application will be developed further, and its impact is still to be assessed.

OpenActive: Getting more people active with open data

OpenActive in a nutshell:

- **Service:** OpenActive is a community-led initiative coordinated by the Open Data Institute. Our aim is to make data available so it is easy to find and book a sporting or physical activity
- **Sector:** sport, health
- **Country of origin:** United Kingdom (UK)
- **Data sources:** data from national leisure centres and sporting bodies
- **Number of employees:** 2–10
- **Website:** www.openactive.io

OpenActive is a community-led initiative working across the physical activity sector and backed by National Lottery & grant funding from Sport England and DCMS. Now entering its fifth phase, the initiative is coordinated and hosted by the Open Data Institute (ODI). The journey of OpenActive started in 2015 in response to the fact that more than 40% of the English population struggled to have an active lifestyle, a significant barrier being finding physical activities in their local area. OpenActive helps to address this problem by **helping its community members to publish standardised open data on physical activities and to promote innovation in making it easier to find and book these opportunities online.**

Figure 16. Open Active logo

What services does OpenActive offer?

To achieve its main goal of encouraging people to be more active and enabling easier access to sport activities, **OpenActive developed a standard format to publish and use data about sport and physical activity opportunities.** Activity providers have two ways of promoting their activities to people, either by inputting this information directly into their own applications and websites (ie as data providers) or by relying on software tools that distribute it to further gathering applications and websites (ie via system providers). However, activity, data and system providers often use different formats for publishing their information, which can make it harder for people to find sport activities to book and attend. The open data standards developed by OpenActive help overcome this problem, benefitting both activity providers and the wider community.

While being born as a standards initiative, OpenActive is increasingly focusing on **supporting organisations to better understand the power of open data**. This includes helping activity providers to use the data standards, and building skills and capabilities across the sector to innovate with data to address the specific problems faced by people wanting to get active.

What data does OpenActive use?

The main OpenActive data providers are leisure centres (civic gyms) and sporting bodies, who tend to already have software in place to track activities and members. In the UK, this market is dominated by two or three software providers that specialise in leisure management & membership systems. Because of this, the main focus of phases 1 to 4 of OpenActive, starting in 2015, was to work with these providers to implement the OpenActive standards and support them to open up their data on sport and physical activity opportunities.

Another critical data source are the smaller organisations with no management systems, or sometimes even individuals (e.g., a yoga instructor). A member of the OpenActive community created a simple data entry application, called Open Sessions, that supports such providers in sharing information on activities offered, to allow these to be more widely advertised as open data. Other organisations such as the National Governing Bodies for specific sports are now publishing their data conforming with OpenActive standards – data that would have otherwise remained in silos. Opening up all this data allows users to fully reflect the varied choice of opportunities available in a local area.

While OpenActive focuses on developing and promoting the standards, **commercial partners are supporting implementation, cleansing data and providing middleware services**. OpenActive also provides information on whether data is conformant and some tools to allow organisations to undertake the data cleaning themselves.

How does OpenActive create impact?

In the last seven years, OpenActive has had a tangible impact on the English physical activity sector, with **data on more than 200,000 opportunities for physical activity being published every month from 1,200 sites and 70 organisations**. This is mainly in England – especially urban centres like London – but also in Wales and Scotland. While only around 5% of the supported organisations provide bookable activities at this stage, data is regularly being published and organisations are being empowered by OpenActive´s open data approach.

In the past few years, the focus in the sector has shifted from organised sport in a conventional sense to physical activity & movement more broadly. This is reflected in Sport England's 10-year strategy – Uniting the Movement – and in the wider objectives of the fifth phase of OpenActive. OpenActive strives to **have a greater impact on underrepresented demographics, looking beyond the big gyms at other use cases for OpenActive data.** In particular, looking across the sector to identify the potential for innovation that addresses specific user problems, for example, where there is inequality in access or experience, such as that faced by disabled people, or ensuring positive experiences for children and young people as the foundation for a long and healthy life.

In this broader context, Tim Corby and Howard Askew, from the ODI's OpenActive team, also envisage expanding the community network and encouraging more people to explore OpenActive data in relation to a broad range of challenges, for example, in supporting active travel, or promoting social prescribing through links with the Open Referral UK standard.

Tangible data: letting citizens experience data by making datasets physical instead of digital

Tangible Data in a nutshell:

- **Service:** Tangible Data transforms data from its digital context to a physical context by creating data sculptures in the public space. These data sculptures help people that lack certain digital skills to experience the data.
- **Sector:** culture
- **Country of origin:** Spain
- **Data sources:** open data from international bodies (e.g., NASA, Worldbank) and further platforms
- **Number of employees:** 2 (no full FTE)
- **Website:** www.tangibledata.xyz

Tangible Data strives to address the issue of lack of knowledge, misinformation, data accessibility, and literacy in relation to sustainability challenges. According to Tangible Data, we are failing to get the best out of the data available to us. By making data touchable and physical, they are trying to bridge the data divide to groups of people without digital and data skills.

What services does Tangible Data offer?

Tangible Data was founded by Antonio Moneo and is one of the participants in the Datathon of 2022. Antonio observes that global warming is being denied by large groups of people and conspiracy theories are also coming back into vogue. Apparently, as a society we fail in informing certain citizens about the available data about these topics.

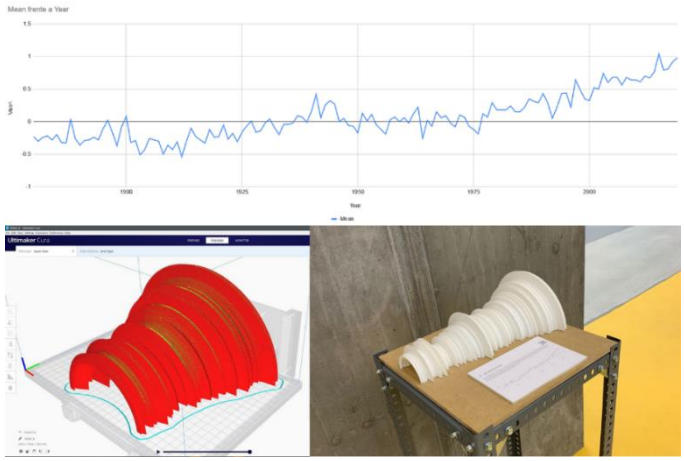
Data has the potential to transform our world by providing evidence to understand the needs and the impact of sustainable policies. But despite important advances in visualisation techniques, digital barriers significantly limit the impact of data. Instead of making data as easy to understand as possible, many organisations are busy building complex interactive dashboards **This project aims for a new approach, using three-dimensional, physical representation of datasets to reach non-digital audiences in non-digital contexts**. In words, Tangible Data tries to move data from the digital to the physical context. By making data sculptures, people can experience the data. These sculptures can then be placed in front of government buildings to inform citizens about certain subjects.

An interesting example is a prototype of the climate change tunnel that Tangible Data has already made (see Figure 17). The data in the figure shows the increase in average temperature on Earth since 1880, leveraging data provided by NASA. The greater the warming, the larger and more spacious the tunnel becomes. The prototype of the tunnel is just 40 centimetres high, but this tunnel could easily be made a few metres high. If the tunnel is sufficiently large, then people can walk through the tunnel and experience the scale of global warming.

Other sculptures deal with the worldwide reduction of poverty and trust in public institutions. The aim is to help visitors familiarize with relevant data about sustainable development challenges.

Tangible Data makes the sculptures using 3D printing and laser cutting techniques, which are highly scalable. This also makes it possible to produce the sculptures locally through involving the local makers community.

Figure 17. From data about climate change to a digital visualisation to a 3D prototype



What data does Tangible Data use?

Most of the sculptures use open data, which is easy to find and has a licence for re-use. For example, a dataset from NASA was used to illustrate climate change; one from the Worldbank to describe the evolution of extreme poverty; and data from Our World in Data to describe changes in trust in public institutions. In some cases, company data is used when a certain company would like to have a visualisation special for itself.

Tangible Data only applies the necessary transformations to the raw data in order to produce the 3D model and, in some cases, soften the edges of the sculptures and make them more *touchable* for visually impaired audiences. The real challenge lies in creating a 3D model that visualises the impact.

How does Tangible Data realise impact?

Raising awareness about sustainability challenges is the first and most natural impact of the project. Data sculptures are designed to increase the visibility of certain topics and to trusted data sources that provide accurate information about that specific topic.

A second impact is about empowering communities to leverage the use of data and technology. For example, Tangible Data is currently working with visually impaired collectives to promote innovative approaches to data; with professors (from K-12 to Masters) to design innovative teaching materials; and with artists of different kinds to discover new intersections between art, technology, and data.

Thirdly, Tangible Data aims to engage citizens in the solution of sustainable development challenges. Every data sculpture is equipped with a QR code that directs audiences to a website where visitors will be able to purchase replicas of the data sculptures and contribute to the cause represented by the data sculpture.

In the coming years, **Tangible Data wants to make large data sculptures that can be exhibited in public places**. Tangible Data is also looking for funding to continue its work. To this end, they also work together with organisations that ask them if they want to develop a data sculpture

Hale & Hearty: the knowledge-based application improving the health and wellbeing of Irish citizens

Hale & Hearty in a nutshell:

- **Service:** Hale & Hearty is a knowledge base created by the Irish government to make health and wellbeing information more accessible and incentivize citizens to a healthier lifestyle.
- **Sector:** health, well-being
- **Country of origin:** Ireland
- **Data sources:** open data from data.europa.eu, local authorities, sport organisations etc.
- **Number of employees:** 2-3
- **Website:** haleandhearty.ie

Hale & Hearty is an EU funded project managed by the Open Data Unit in the Department of Public Expenditure and Reform (DPER) of the Irish government and supported by the Central Statistics Office, the Department of Health, the Fingal County Council, Derilinx, and the Ireland's Data Cloud Cluster. It aims at **making health and wellbeing data open for analysis, insights and action** through a knowledge base linking data from local authorities, central statistics offices, and healthcare providers. To further incentivise people to learn from this public information and conduct healthier lifestyles, the project also involves the creation of a mobile application.

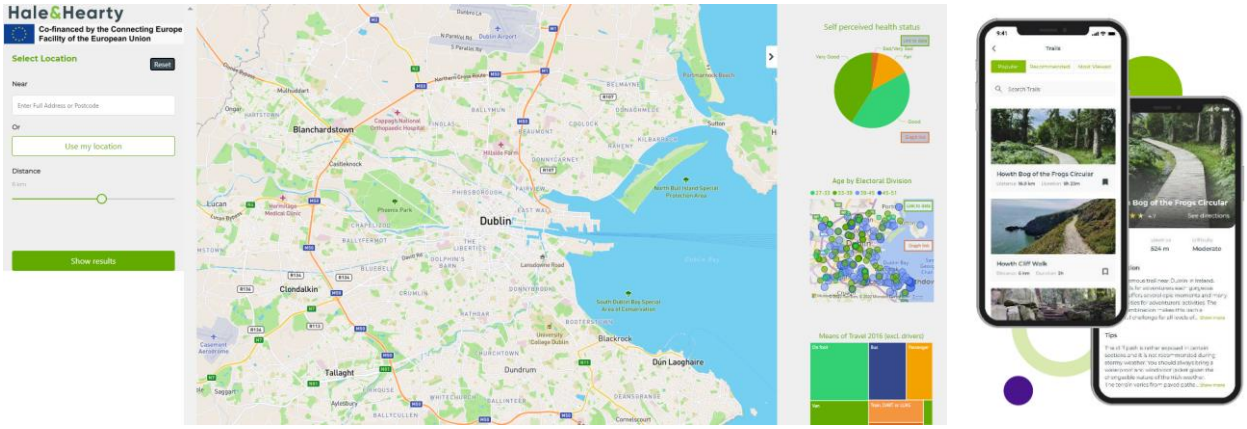
What services does Hale & Hearty offer?

In August 2019 the Open Data Governance Board of the Irish government proposed to create a knowledge base to make health and wellbeing information openly available. The idea was to allow the general public to use this information to improve their personal health and sport activity; to allow data professionals to better contextualize health statistics; and to enable health professionals to make use of this data for new innovative services.

Financed through the EU Connecting Europe Facility grant and supported by six partner organisations, the Hale and Hearty knowledge base offers an extension of the Irish Open Data Portal (data.gov.ie), by providing up-to-date API access to high-value datasets and statistics related to the health and wellbeing sector, including CSO demographic and mobility data, local governmental data, OSi data on the location of sports and amenity facilities, NTA data and health research data.

To give the general data user further means by which to access the data and also the choice to add their own anonymised data to track their activity and give mobile access to health and well-being facilities information, Hale and Hearty also offers a mobile application. This allows users to access the data of the knowledge base to find local activity trails more easily in their area and connect their wearable devices to track their sport activities. The application also works as incentive ad gamification engine insofar it allows users to earn points for each step they take, win bonuses, redeem vouchers, and compete with other users.

Figure 18. Hale & Hearty knowledge base and mobile application



What data does Hale & Hearty use?

The data used for Hale & Hearty knowledge base and mobile application is completely open. In fact, this data is published on data.gov.ie, if it is not already there. Data sources consulted to retrieve this data are different: data.europa.eu, sports organisations, the Health Indicators Service of the Health Service Executive, as well as local authorities. All the data is published under the CC BY 4.0 licence.

In general, the processing of the data is carried out by the data providers. In the case of the CSO data, entries were added to the data catalogue using the CSO API. Other data from data.gov.ie was flagged for inclusion using the ´group` feature and a harvest process was set up to publish the Hale & Hearty group datasets on the data catalogue. This means that any updates to these datasets are reflected in the data catalogue and knowledge base when the harvester is run.

Once a month, an audit is done of any new datasets published. Once relevant datasets are identified, they are added to the Hale & Hearty group on data.gov.ie and are published on the Hale & Hearty data catalogue by the harvester.

To present the Hale & Hearty user with a menu of data which they can filter to select data of interest, the data was also categorised.

How does Hale & Hearty realise impact?

The team of Hale and Hearty regularly monitors the number of hits to the knowledge base. In January 2022 they ran a survey to gather feedback on the website and potential developments of the mobile application and the knowledge base splash page includes a request to participate in a survey on its usefulness and relevance. The team also held workshops for health care professionals to assess how relevant and useful Hale and Hearty to their requirements. Despite this, it is difficult to objectively monitor the impact of the Hale and Hearty Action on Ireland's health.

Looking ahead, the sustainability of Hale and Hearty requires substantial investment of expertise and resources. The knowledge base will continue to be available to the public and data will be added and updated on it. The Hale and Hearty mobile application requires further development to be sustained and made widely available. It needs to become a tool for a large-scale health service programme of activity. This element of the project requires a sponsor to actively manage it as it is outside the current capacity of the Open Data Unit.

EU Twinnings: exploring similar regions across Europe with open data

EU Twinnings in a nutshell:

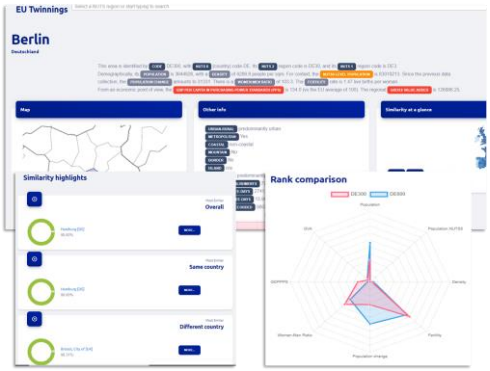
- **Service:** EU Twinnings uses open data from Eurostat to make statistics accessible to a wider audience and show similarities across EU regions.
- **Sector:** society, European integration
- **Country of origin:** United Kingdom (UK)
- **Data sources:** open data from Eurostat and data.europa.eu
- **Number of employees:** 1
- **Website:** data-europa-eu.eu-twinnings.site

EU Twinnings is the visually catchy application that the British-Italian data scientist Giuseppe Sollazzo presented at the EU Datathon competition in 2020. The application is based on an idea that Giuseppe firstly developed when reading an academic paper that calculated the degree of similarity between literature pieces: But what if the same concept could be applied to European countries? EU Twinnings realises this **question by allowing people to explore and visualise Eurostat´s statistics on specific regions and municipalities and compare their similarity** with other European territories.

What services does EU Twinnings offer?

EU Twinnings web application is not a commercial, but an exploratory idea through which statistics and open data is made more understandable and similar characteristics of EU countries are highlighted. To do so, the app uses a formula (i.e., the cosine similarity, which is a measure of similarity between two sequences of numbers), which produces a percentage of similarity for European regions. In practice, the user can select a specific area or municipality in Europe and visualise the extent to which that particular area is similar to others in Europe, according to socio-economic parameters such as population, gender balance, GDP, etc. Below a first overview dashboard on the selected area, the app provides ´similarity highlights`. By clicking on ´more´, a rank comparison in the form of a spider chart on a specific similarity highlight and across parameters can be visualised.

Figure 19. EU Twinnings´ interface



What data does EU Twinnings use?

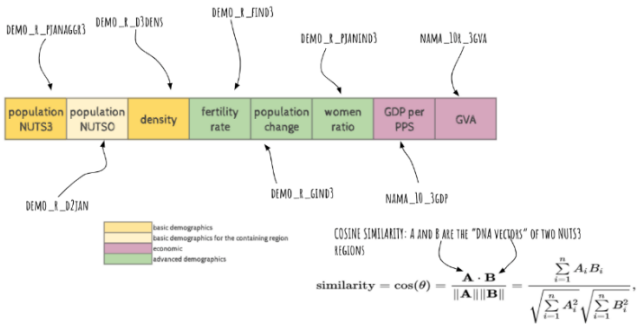
EU Twinnings is completely based on **open data from Eurostat**. The datasets used are considered both from a **NUTS3 and NUTS2 level**, i.e., they refer to the current NUTS 2021 classification valid from 1

January 2021 and listing respectively 242 regions at NUTS 2 and 1166 regions at NUTS 3 level. The datasets retrieved from Eurostat relate to socio-economic parameters such as population density, fertility, gender, GDP, GDA etc. Sometimes, however, the same coverage of data is not available for every region and finding parameters of similarity may become complicated. Therefore, while Eurostat provides access to a variety of different data and the open license allows to use this data in a very easy way, Giuseppe is considering relying also on other open data, for example from local census.

For both NUTS3 and NUTS2 regions, Giuseppe prepares a list of ten **demographic and socio-economic parameters** and a list of regions for which those parameters are available. He uses the EurostatJSON API to download data from Eurostat and undergoes cleaning and unit testing. Following this, he calculates the similarity between two regions by applying the similarity formula by him selected, which produces a percentage extent to which those two regions are similar based on the definition used for similarity.

EU Twinnings´ **similarity formula** is automatically reviewed once a year, as the data for NUTS2 and NUTS3 regions is periodically updated in Eurostat. What Giuseppe still finds difficult to fully automatically adapt are updates of the classifications of the borders´ areas and changes to tables in terms of terminology.

Figure 20. Similarity formula used by EU Twinnings



How does EU Twinnings realise impact?

Given the non-business driven focus of EU Twinnings idea and in light of privacy reasons, the app does not identify its daily and monthly users through specific analytics and it is therefore hard to quantify its impact on a wider audience. On the other hand, the impact of EU Twinnings is qualitatively proved by the strong interest awaken by the application during the 2020 EU Datathon. Following the event, Giuseppe received several suggestions, for example to use EU Twinnings within the framework of the Erasmus programme as a tool for mobility students. The impact and scalability of the application is also demonstrated by the new three-year **collaboration between EU Twinnings and data.europa.eu**, European data portal managed by the Publications Office of the European Union.

In this context, Giuseppe is working on some **new features of EU Twinnings, including feedback button** through which users can share their input and contribute to improving the application. In terms of improvements, Giuseppe has also just concluded a **revamp of the design of the application** and is considering new definitions of similarity to keep the formula of EU Twinnings as inclusive and updated as possible. Similarly, he is not excluding **to integrate data on tourism and criminality** and to possibly buy this data from non-open repositories. In fact, sources of open data – especially for climate or academic data – do not generally have a level of granularity useful for an app like EU Twinnings. Hence, it is necessary to understand at which level data can be retrieved and if this data is worth buying to better calculate the similarity of EU regions.

Open Food Facts: informing the consumer about the nutritional and ecological effects of their food

Open Food Facts in a nutshell:

- **Service:** Open Food Facts creates easy to understand information about the nutritional value and the environmental impact of food as well as a large food product database containing over 2.5 million products
- **Sector:** food, health
- **Country of origin:** France
- **Data sources:** open data from food producers and further national and European sources
- **Number of employees:** 7
- **Website:** fr-en.openfoodfacts.org

The food we buy can have negative effects on our health and on the environment and we, consumers and manufacturers alike, often lack the information to make the right decisions. Open Food Facts is a **large open data base for food products where users can find information about the ingredients of certain products**. Using other open data sources, Open Food Facts creates easily understandable scores for nutritional value, environmental impact, and the extent to which the product contains processed foods.

What services does Open Food Facts use?

Open Food Facts the goal to make food data a common good that can be used to challenge some of the large problems that developed countries are currently facing, such as the obesity crisis and global warming.

For the first seven years all work for Open Food Facts was done pro-bono, but the last few years it is able has received grants from the French National Health Agency and other institutions (e.g., Next Generation Internet from the European Commission, private foundations), and they recently received the Google Impact challenge for climate, which made it possible to further expand the organisation.

Open Food Facts currently is a **database of 800 thousand products in France and 2,5 million products worldwide**. On the website, users can find much of the information that can also be found on the label of the product if they would buy it in the supermarket. Think for instance about the ingredients and whether the packaging can be recycled. Moreover, the website shows in which supermarkets and in which countries the product can be bought.

It is not an easy task to look at the ingredients and understand whether a certain product is good for you or not. That's why Open Food Facts also adds the Nutri-Score on their website. The Nutri-Score is an attempt to simplify the nutritional value of food products on a scale from A-E and can be calculated based on the ingredients in the product. The last couple of years, **the Nutri-Score has become widely adopted across France** and food producers even reach out to Open Food Facts to discuss their Nutri-Scores.

Open Food Facts is in the middle of the rollout of a so-called Eco-Score together with a number of non-profit organisations and start-ups. The Eco-Score is an environmental score from A to E which makes it easy to compare the impact of food products on the environment. The Eco-Score is based on a life

cycle analysis of the product, combined with data that can be found on the label, such as the mode of production, the origin of ingredients, whether the product uses packaging that can be recycled and whether the product has a negative impact on endangered species (for instance by using palm oil).

Lastly, Open Food Facts also provides a Nova-Score, which is another simplified measure constructed by food scientists to show the extent of processing done for the product, given that ultra-processed foods have negative health effects.

What data does Open Food Facts use?

The data on Open Food Facts is collected either by the users of the platform or by food producers that want to have the data on their products available on the website. First, the users entered all of the information on a label into Open Food Facts, or they shared a picture of a label which was then manually uploaded by the Open Food Facts team. Now they have **an algorithm that automatically reads the information on the label**, sparing the team lots of time. Producers can add their data via the producer's platform. Smaller organisations can enter their data manually or via Excel, whereas big food producers (such as Nestlé and Ferrero) can use automated means to upload data of their new products.

Open Food Facts is not just an open database. It also uses other open data sources to complement their analysis. They use European sanitary numbers on labels to trace in which factory a product is made and data from the European Food Agency to find the risks of overexposure to certain additives. Importantly, for the new Eco-Score the life cycle analysis data is from the open Agribalyse environmental database designed by ADEME and INRAE. Without these open data sources, Open Food Facts would not be able to provide their Nutri-Score, Eco-Score and Nova-Score.

How does Open Food Facts realise impact?

The biggest impact Open Food Facts realised is the adoption of the Nutri-Score in France. What started as a niche rating system developed by food scientists, is now on almost all products in French supermarkets. Food manufacturers actively look for their advice on how to make their products more nutritional and eco-friendlier. Their goal is to take the Nutri-Score global and to create a similar impact with their Eco-Score. Another addition could be to take a better look at the prices of food: which parties in the supply chain earn what?

Important to note is that everything Open Food Facts produces is open: **their data is open and downloadable via an API and their algorithms and source code are open as well**. Scientists often use the Nutri-Score data for research about overweight and many other organisations do so as well. Currently over 150 applications use the data from Open Food Facts for several purposes such as helping pregnant persons, people with disabilities or people with certain allergies to choose products that suit them. The large food and cosmetic scan application Yuka also started off with Open Food Facts data and still shares their data with them.

Integreat: the German platform helping municipalities to integrate migrants and refugees

Integreat in a nutshell:

- **Service:** Integreat is a digital platform that provides all relevant information in several languages at the municipal level to newly arrived migrants and refugees.
- **Sector:** society, migration
- **Country of origin:** Germany
- **Data sources:** open data from national municipalities
- **Number of employees:** 27-35
- **Website:** integreat-app.de

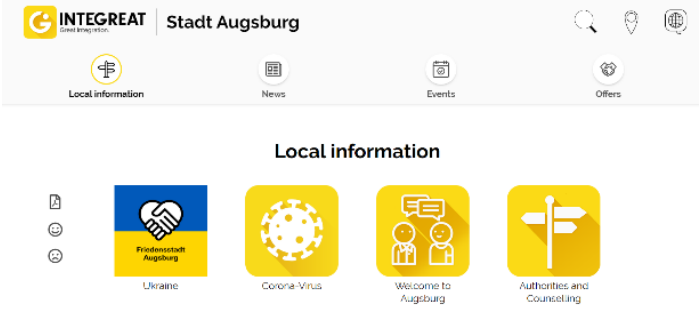
Integreat started in 2015 in Augsburg under the name ´Refguide+` to help the Bavarian city cope with the wave of incoming refugees and the information and linguistic gap that came in consequence. Soon after that, further municipalities in Germany reached out to the Integreat team to implement the solution. At the moment of writing, in July 2022, Integreat is helping **90 municipalities to make information for the integration of people with migration background publicly available** in different languages. Integreat functions therefore both as integration process tool and as incentive for the further opening of key data at municipal level.

What services does Integreat offer?

The idea behind Integreat is to gather all possible and useful information to allow refugees and migrants in Germany to settle and integrate in the new society more easily. To do so, the solution offers refugees and migrants **public access to different data and information provided directly by the municipalities** where they reside, such as administrative processes, job opportunities, education and social service facilities, as well as more recently Covid-19- or Ukraine-related information. Refugees and migrants can access this content in multiple languages either on the app, website or offline through ad-hoc brochures.

All information in Integreat is provided by municipalities and experts in the area, which are responsible also for the maintenance of this data: no IT-know-how is required in order to add and maintain information in Integreat as the content management system is easy-to-use. The Integreat team, on the other hand, helps municipalities with the first implementation of the solution and remains available for advisory and tech support on publishing the data. Moreover, the team works to create more **opportunities for exchange with other cities and districts and to foster the sharing of standardised information** among them, especially when it comes to legal information.

Figure 21. Integreat app for the municipality of Augsburg



What data does Integreat use?

Integreat is completely based on open data. The idea is to decrease information poverty by making data on housing, healthcare, education, family services, free time, work, and latest topics such as the Covid-19 pandemic or the war in Ukraine available and easily accessible everywhere. This data is **common knowledge published on Integreat directly by municipalities**. The complete programme and source code of the Integreat is in fact freely available and provided under an **open-source licence (MIT).** Moreover, all content of the various municipalities is licensed under Creative Commons (CC BY 4.0), meaning that new and existing partners can benefit from each other in terms of content and translations, and workload in creation and maintenance is minimised. There is no need for manipulating the data by the Integreat team, which however offers tech support and advisory services to municipalities on how best to publish the information and maintain the Integreat platform.

How does Integreat create impact?

Since its development Integreat has been constantly expanding to new areas, reaching in July 2022 **90 partner municipalities across all Germany**: in Bavaria, every third municipality currently uses Integreat and the solution is well spread also in North Rhine-Westphalia and Hessen. Given the different political structure, however, Integreat has not yet reached many municipalities in the north of Germany and is so far not at all implemented in Thuringia and Mecklenburg-Vorpommern. While in the first three years since its development Integreat was supported by public funding, since 2018 municipalities are required to pay between **5000€ and 7000€ a year to adopt the solution**. In 2021 the total revenue of Integreat amounted to around 240.000€.

Besides the good geographical spread and encouraging economic development of the last years, the positive impact of Integreat on municipalities is certainly also proved by the fact that since the beginning very view of the partners have cancelled their subscription to the platform (main reason for cancellation being personnel shortages). The Integreat team is very keen on maintaining a **good relationship to the municipalities** and organises once a year **qualitative feedback talks** with them. This has allowed Integreat to distinguish itself from competitors, offering not only a technology second to none, but also becoming very close in the collaboration with municipalities.

In terms of impact that Integreat has on its end-users, namely refugee and migrant communities in Germany, the evaluation is more complex, as downloads are not sufficient to properly track the usage and the platform per se can also be accessed offline. Yet, the Integreat team is currently conducting a **randomised control trial study funded by J-PAL Europe to see how the use of Integreat is changing migrants´ and refugees´ ability to access services** in their municipality of residence and which information within Integreat are most useful for them. The first results should be published in September 2022.

Looking ahead, the Integreat team is planning several updates for the platform. Firstly, they would like to offer a **better automatic translation** to reduce translation costs for municipalities. Secondly, they aspire to make it **easier for Integreat to be integrated on other websites** of local organisations. Thirdly, they are in the process of **piloting a chatbot** as an alternative way of finding information. Finally, they would like to offer to migrants and refugees the **possibility to look for jobs** directly through Integreat and **scale the solution beyond Germany.** As a first step, they are considering implementing the solution in Greece.

Evapp: Belgian app uses open data about AEDs to save lives of citizens when they have a cardiac arrest

EVapp in a nutshell:

- **Service:** EVapp sends volunteers with first aid training as quickly as possible to someone having acardiac arrest . These volunteers often get there before the ambulance staff and thus save lives.
- **Sector:** health
- **Country of origin:** Belgium
- **Data sources:** open geodata and anonymised data from national emergency centres
- **Number of employees:** 12
- **Website:** www.evapp.org

With a cardiac arrest, the first 10 minutes are the most important, while the ambulance does not always arrive within 10 minutes. EVapp uses a **network of first responders to have someone on the spot as soon as possible to start the resuscitation**.

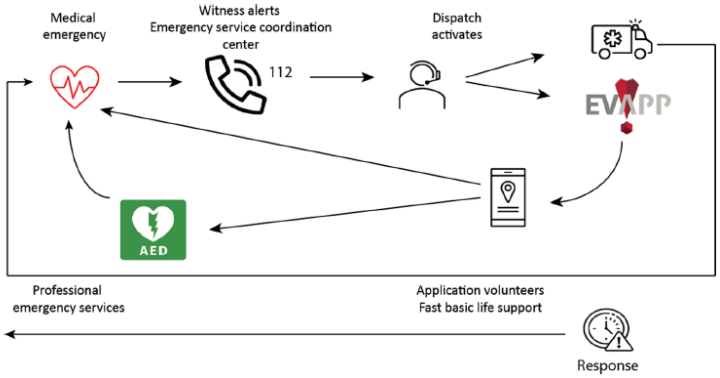
What services does EVapp offer?

Emergency Volunteer Application (EVapp) was founded in 2015 by the company Prior-IT and EVapp NGO as a non-profit association to help people with a cardiac arrest faster. Since 2017 the app has been live in the Hoogstraten region of Belgium, for further rollout in Belgium the creators are still waiting for Belgian legislation to make this possible. Hoogstraten was chosen because it is one of the most difficult places in Belgium for ambulances to reach.

The app works as follows: as soon as someone has a suspicion of cardiac arrest, drawning or electrocution and the Belgian emergency number 112 is called, the emergency centre forwards this message to the ambulance and to EVapp. The app then alerts automatically five citizens with first aid certificates who happen to be in the vicinity of the victim. **Two citizens receive the location of the victim and must go to the victim as soon as possible to perform CPR**. They often reach the victim before the ambulance. Other volunteers receive the location of the nearest AED and must collect the AED as quickly as possible and take it to the victim.

In Belgium, anyone can obtain a First Aid certificate. These certificates are valid for five years. As soon as the certificate is no longer valid, the app users are no longer asked to come to the location of the accident. When the certificate is obtained, the app's existence is brought to the attention of the certificate holders. At this moment 2700 volunteers are connected to the app, of which 250 live in Hoogstraten.

Figure 22. Schematic representation of the EVapp-system



What data does EVapp use?

EVapp makes use of Open Software as much as possible. Think for example of Open Streetmap to find the location of the victim and the location of the first aiders. In addition, Prior-IT is working on mapping the locations of all AEDs in Belgium. Part of this data is open: they received a list of 8700 AEDs and their locations from the government and additional data from several cities. Unfortunately, in some cities close to half of all available AED's were not part of the data provided by the government. AED-manufacturers shared data on which organisations bought AEDs from them with Prior-IT to fill the gaps. **Prior-IT contacted these organisations to confirm the presence of the AED.**

The AED data still need to be enriched. AEDs in shops are only accessible when the shop is open for instance. Using webscraping, the opening hours can be found for this, but in many other cases it was necessary to contact the owner of the AED to ask for additional information. The enriched AED location data collected is made available as open data.

Prior-IT also receives data from the emergency centres. Only the location of the victim is shared for privacy reasons.

How does EVapp realise impact?

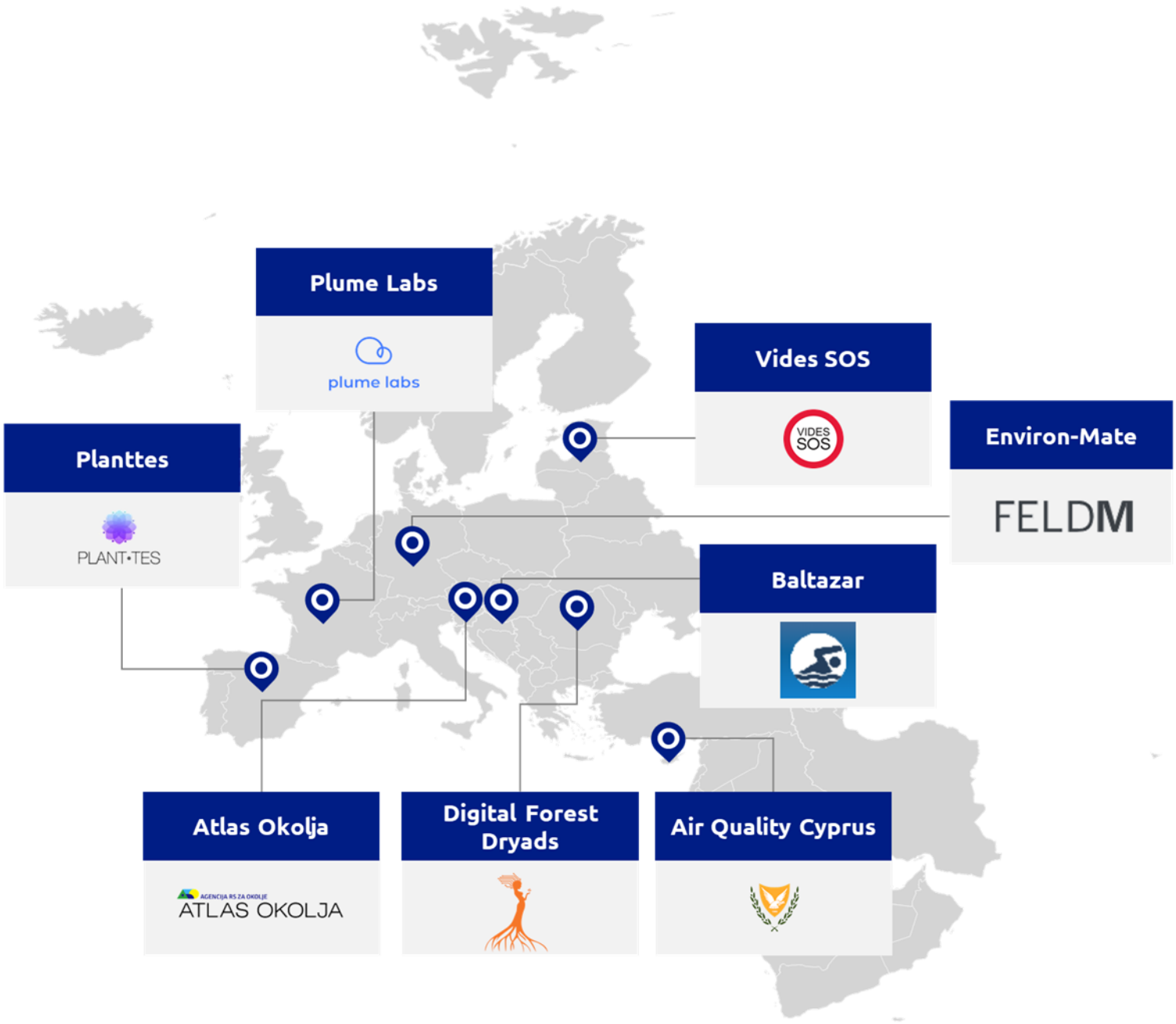
First estimates in Hoogstraten show that EVapp increases the chance of survival by five to six percent. Moreover, **simulation of nation-wide EVapp implementation resulted in an additional yearly 910 quality adjusted life years (QALY)** gained over the current baseline case scenario with a lower estimate of 632 and a best-case scenario of 3204. Moreover, the cost per QALY would also decrease as a consequence of both the lower healthcare costs for patients with good neurological outcomes and the more efficient use of available resources[5].

After each incident EVapp collects feedback on the functioning of the app and the accuracy of the alarm. There is also emotional support available for volunteers in case the victim did not survive their cardiac arrest.

In the upcoming years, EVapp wants the app to become available nationwide. Furthermore, Prioir-IT is working on another app: the AED-hunter. This app should show all AEDs in Belgium on a map, so people can immediately see on the app where the nearest available AED is.

[5] Vercammen, Steven, and Esther Moens. "Cost-effectiveness of a novel smartphone application to mobilize first responders after witnessed OHCA in Belgium." *Cost Effectiveness and Resource Allocation* 18.1 (2020): 1-11.

3.4.Environmental impact



Digital Forest Dryads: Using open satellite imaginary to protect forests from illegal deforestation

Digital Forest Dryads in a nutshell:

- **Service:** Digital Forest Dryads application aims to protect forests from illegal deforestation in Europe by combining aerial and multi-spectral satellite imagery.
- **Sector:** environment, forest
- **Country of origin:** Romania
- **Data sources:** open geodata and multi-spectrum data from several EU open sources
- **Number of employees:** 5
- **Website:** digital-dryads.eu

Digital Forest Dryads was developed by the Romanian team made up of Razvan Pistolea (CTO), Andrei Mocanu, Sergiu Eftimie, and Adnan Temur to participate in the 2020 edition of the EU Datathon. By relying on data from EU sources such as Copernicus and Eurostat, as well as the Google Earth data catalogue, the team created an **application able to visualise an interactive map of deforestation and easily distinguish illegal activities from legal cutting**. Besides Romanian forests, the app offers interactive maps also of Croatia, Hungary, Belgium, France, Italy, Germany, Bulgaria, Greece, Spain, and Albania.

What services does Digital Forest Dryads offer?

The goal of Digital Forest Dryads is to empower the forestry industry by helping both law enforcement authorities and ministries to **better analyse deforestation** and be able to take informed decisions against it.

The interactive map of Digital Forest Dryads allows in fact to **visualise which territories are covered by forest and in which areas the forest is disappearing**. More specifically, forest loss is represented by red areas on the map, while green zones refer to protected forests according to UNESCO, i.e., areas where cutting is not legally permitted.

By zooming on the map, it is also possible to see **yellow and red dots**: the yellow dots are used to indicate acts of deforestation that occurred legally, whereas red dots stand for illegal actions.

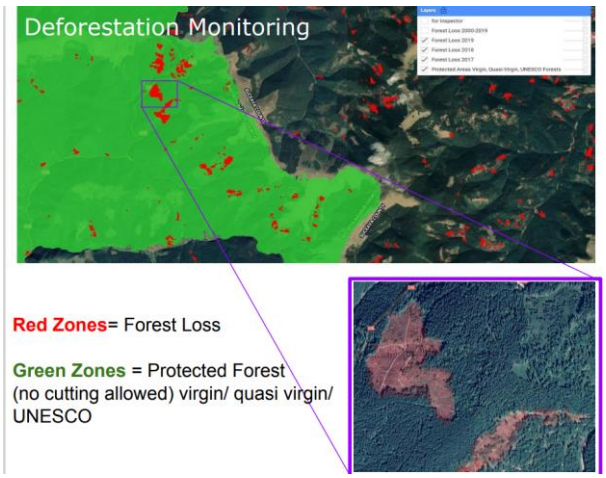
Finally, Digital Forest Dryads offers the possibility to view deforestation in the selected country over time, visualise the state of protected forests, and inspect legal deforestation.

What data does Digital Forest Dryads use?

The team based itself both on open and non-open data**. Open satellite imaginary** come from DEFIS, Copernicus, EUMETSAT, SANTE, Eurostat. Land images were also retrieved from the Google Earth data catalogue and Amazon Web Services.

Further data was obtained by the team through lobbying activities. For example, the information provided in the yellow dots concerning the legality of deforestation in a particular area – such as the IP, the cutting year, the entity responsible for the protection of the area, and the body that gave the permission to cut trees in the area - is not publicly open. The team was able to retrieve this data by writing e-mails to ministries, which then provided them with the needed GIS data.

Figure 23. Interactive map of Digital Forest Dryads



The data used by the web application, including the one coming from Amazon, is updated every 5 to 6 days and after cleaning was processed through machine techniques able to identify and classify trees.

Yet, the application per se is still based on **historical data from 2017, 2018, and 2019.** After the proof of concept and the first pilot, the team stopped processing data due to lack of resources – the project would require millions of Euros (under **1% of today's costs** that involve using traditional methods) – and threats from politically corrupted powers in Romania whose mismanagement was exposed by the application.

How does Digital Forest Dryads realise impact?

The impact that Digital Forest Dryads has been having since its launch can be observed both on a quantitative and qualitative level. In fact, the team regularly keeps track of the application´s users through Google analytics. The monthly usage swings between **800 and 1000 users per month**, with most of them utilising the desktop rather than the app version of Digital Forest Dryads.

The application is therefore well known among its target audience and attracted quite some interest in the Romanian government. As mentioned above, by providing clear information on the state of (illegal) deforestation in Romania, the application exposed the misconduct of some corrupted political bodies, which even started threatening the team. More recently, however, the Romanian government decided to re-use the idea behind Digital Forest Dryads, which will be implemented through the financial resources provided by the EU Recovery and Resilience Facility.

Overall, the application has been **successful in raising awareness** about the deforestation problem in Romania (and in the rest of Europe) but is **lacking the support – especially economic – to further be updated.**

Despite this, following the release of Digital Forest Dryads, the team received **many requests of collaboration and two other projects started.** A first project is ´wood watcher`, an application through able to calculate the volume of a pile of wood from a simple picture taken by the user. This is a very useful application for law enforcement authorities fighting illegal trafficking of wood. The application worked so well for Romania that the team released it for the entire world. Recently the team also presented the app during an Interpol conference on East-European and Latin American practices and received the best practice in Europe award for their innovativeness.

Air Quality Cyprus informs citizens about air pollution across the island

Air Quality Cyprus in a nutshell:

- **Service:** Air Quality Cyprus provides citizens with real time information about several forms of air pollution. Users can find the data online or choose to be proactively informed about certain substances via the app on their smartphone.
- **Sector:** health, environment
- **Country of origin:** Cyprus
- **Data sources:** open data from national air pollution measurement stations
- **Number of employees:** 5-10
- **Website:** www.airquality.dli.mlsi.gov.cy

Air pollution can lead to respiratory problems, exacerbated allergies, and have adverse neurological, reproductive, and developmental effects and especially vulnerable populations such as children, the elderly, pregnant women, those with heart or lung disease are at risk. In Cyprus air pollution is caused by transport, industry, and agriculture (to name a few) as well as dust carried by the wind from three of the largest desert areas in the world (the Sahara, the Arabian desert and the Syrian desert). Air Quality Cyprus **helps users with real time data about air pollution across the country** and information about the impact certain forms of air pollution on their health.

What services does Air Quality Cyprus offer?

The Air Quality Cyprus website launched twelve years ago to help Cypriots and people in Cyprus to track air pollution in their area. The website is run by the Department of Labour Inspection (DLI), Ministry of Labour and Social Insurance. In 2019 they also launched apps for Android and for iOS to make it easy for users to get real-time information on their smartphones.

The application and the website show a map of Cyprus and its nine air pollution measurement stations, which are spread across the country. Users can hover over the measurement stations and **find up-to-date pollutant concentrations** for eight polluters in the majority of the stations. Colour coding informs users about the risks of certain pollutant concentrations. The app also enables users to get notifications when pollutant concentrations reach a certain safety threshold in their area.

Figure 24. Information about air pollutants at the Limassol Traffic measurement station

Air Quality Cyprus also provides information on the different forms and sources of air pollution, the adverse health effects for the different polluters, advice on how to improve air quality, and an overview of existing legislation to prevent air pollution.

What data does Air Quality Cyprus use?

Air Quality Cyprus uses the **data from the measurement stations.** This data is also available on the Cypriot open data portal. The majority of the stations have instruments which are measuring the concentration of Ozone (O3), Nitrogen Oxide (NO), Nitrogen Dioxide (NO2), Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Carbon Monoxide (CO), Benzene (C6H6) and Particulate Matters (PM10 and/or PM2.5) which are updated each two minutes in Air Quality's software and twice per hour in Air Quality Cyprus website and mobile application. Note that the data gets validated *after* instant publication on Air Quality Cyprus, otherwise **real-time information** provision would not be possible. Still, users gain a lot by having the unvalidated real-time information, since its often a reliable estimator of the validated measurements.

How does Air Quality Cyprus realise impact?

Air Quality Cyprus **helps to prevent adverse health effects of air pollution for its inhabitants**. When air pollution reached dangerous heights, then Air Quality Cyprus informs the government which subsequently alarms ministries (Ministry of Health, Ministry of Education, Sport and Youth, etc.), local governments, media and labour unions, who can then take immediate action. Precise estimations of the number life years won because of the Air Quality Cyprus website and apps do not exist (and would be very hard to estimate), but both are used by many. The website has over **800,000 unique visitors per year** and the iOS app, and the Android app have approximately 10,000 users each. Moreover, the website and the apps were updated recently to become better accessible for people with visual disabilities.

In the near future, Air Quality Cyprus wants to create a forecasting tool to predict pollution concentrations. This would require them to also use (open) data from other organisations, such as meteorological institute to accurately account for wind force and direction, heath, rain, and other relevant circumstances.

Vides SOS: the Latvian application to facilitate the reporting of environmental violations

Vides SOS in a nutshell:

- **Service:** Vides SOS is an application designed to alert the State Environmental Service of environmental hazards such as pollution, waste, and litter in nature.
- **Sector:** environment
- **Country of origin:** Latvia
- **Data sources:** open data from OpenStreetMap
- **Number of employees:** 6
- **Website:** www.videssos.lv

Vides SOS is an open data-driven application developed by the Latvian State Environmental Service to allow citizens to **report environmental infringements of air, water, or soil and contribute to a cleaner environment.** The application relies on OpenStreetMaps to visualise the areas where the infringements have happened and allows not only to raise people´s awareness about environmental protection, but also to incentive collaboration between public institutions and citizens.

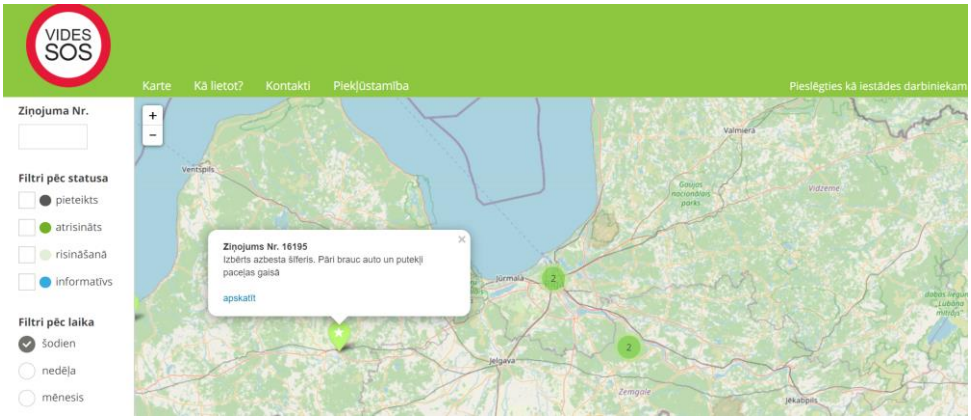
What services does Vides SOS offer?

Vides SOS is smartphone-friendly application that enables Latvian citizens to take a part in taking care of the environment, by reporting to the State Environmental Service infringements of the air (odours, dust, smoke, and radiation), the water (activities of edge fishing, presence of chemicals, dead animals, or oil), or the soil (waste, manure, and oil).

The application represents therefore a **modern solution in the processing of environmental violation reports at centralised and coordinated level** and enhances public involvement and awareness. In fact, any citizen can simply download the application on their smartphone, take a picture of the infringement discovered, and report it with a brief message either anonymously or with their account. In this way, the state or local institutions responsible for the area in which the infringement took place can contact the user for further information and act.

The infringements are then visualised on the map and can be filtered according to whether they have been taking care of and the date of happening.

Figure 25. Vides SOS´s map of infringements



What data does Vides SOS use?

Vides SOS is completely based on **open data from OpenStreetMap**, a collaborative project to create a free editable geographic database of the world. OpenStreetMap® is *open data*, licensed under the Open Data Commons Open Database License (ODbL) by the OpenStreetMap Foundation (OSMF).

To develop Vides SOS, the team of the Latvian State Environmental Service did not need to process any open data, but just use the map from OpenStreetMap to get the coordinates of possible environmental hazards.

How does Vides SOS realise impact?

As Vides SOS allows sending information anonymously, the team does not monitor active users. Yet, it is possible to get a picture of the outreach of the application through the number of reports received. Since the beginning of 2022, the Latvian State Environmental Service has already received **2345 reports of possible pollution**. Last year, in the same period, 1876 reports were collected, which means that in 2022 there has been about **25% increase in reports**. From the received reports in 2022, more or less **35% has already been solved, while 49% has been sent to competent authorities.**

Originally the application allowed for a ´**Clean up myself` option,** which encouraged the general public to get involved and clean up certain areas of infringements themselves. However, since the option was not fully fleshed out and functioning, the team decided to remove it temporarily. With the creation of an ad-hoc department managing the application since June 2020 and following the modernization project completed in September 2021, the team plans on revisiting this issue and reintroduce this function in the future.

Overall, the application has still some technical difficulties that the team would like to address and has its limitations in assigning nature inspectors to watch every corner of the Latvian territory and ensure environmental protection everywhere. Yet, the application is showing a great potential, with not only a great involvement on the side of the citizens and the State Environmental Service, but also with respect to other governmental institutions. In August 2022, the application counted in fact **56 other partner institutions**, all standing for more action and protection of the environment.

-

Planttes: using citizen science to inform people with allergies on which plants are in bloom

Planttes in a nutshell:

- **Service:** Planttes is a citizen science application that informs users about which plants are in bloom and whether this might be of effect to any people with pollen allergies.
- **Sector:** environment, health
- **Country of origin:** Spain
- **Data sources:** open data from the Point of Information on Aerobiology and open geodata
- **Number of employees:** 2 with the help of students
- **Website:** www.planttes.com

Estimations of the number of people in Europe with pollen allergies are as high as 40% in some studies. When certain plants are in bloom then people with allergies experience symptoms such as a runny nose, itchy and red eyes and sneezing. In severe cases the symptoms can even lead to extreme tiredness and the necessity to stay indoors during large parts of the flowering period. Planttes tries to **help people with pollen allergies with precise information on which plants are in bloom** and which pollen are in the air.

What services does Planttes offer?

Planttes is a citizen science project, meaning that it wants to involve citizens in the development of scientific projects. The idea stems from a group of design students and researchers on aerobiology. **The goal of the app is to better understand the relationship between the environment and allergic diseases, contributing to improve the quality of life of the people who suffer them.** At the same time, this would lead to a better understanding of how climate change affects people with pollen allergies and provides an opportunity for students to learn more about plants and their phenology.

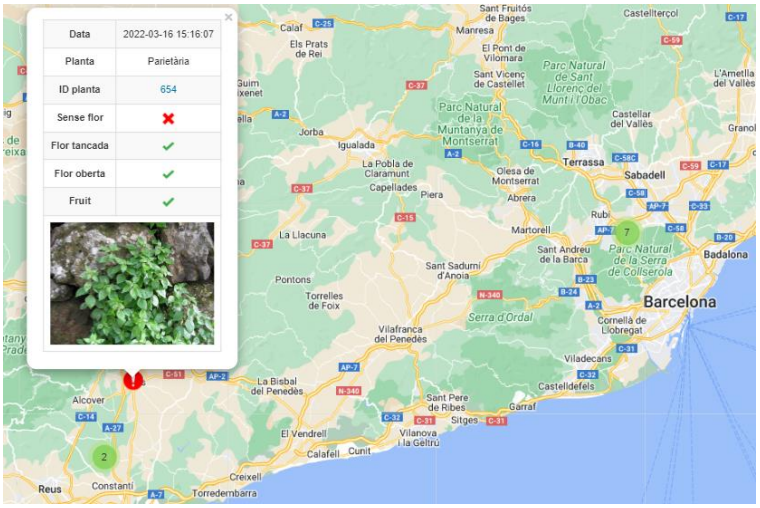
The Planttes-team together with an Artificial Intelligence student build an app that informs users about allergenic plants that might be in their surroundings. Users of Planttes can contribute to elaborate a map of the phenological state (presence of closed flower, of open flower and / or fruit) of the plants in the surroundings that cause allergy by indicating the place, selecting the plant, filling in the phenological state and uploading a picture to the app. Currently the app predominantly has information from Catalonia, but it is useful in any locality where the plants to be informed grow.

The photos of the plants uploaded by the users are shown on a map (see screenshot). By accessing the pop-up of each record users can see the photo of the plant, together with the date of publication and the phenological data that have determined the allergenic risk. The degree of risk is classified into three categories (low risk, increasing risk and maximum risk). Choosing specific filters for certain plants, users can create a personalised risk map.

What data does Planttes use?

The data on Planttes comes from two main sources, being the data and pictures of flowers that people enter into the system and the open data about pollen from the Point of Information on Aerobiology.

Figure 26. Screenshot of the Planttes map with a warning for and a picture of an allergenic plant



The pollen data is collected via so-called pollen samplers at the top of buildings and the pollen analyses under the light microscope done in the laboratory by palynologists**. The data from the pollen samplers allow researchers to estimate which plants are currently in bloom**. In Point of Information on Aerobiology the pollen data are then used to create a score between 0 and 4, where 0 means that people with pollen allergies should have no problems going outside and 4 means that their allergies will be intense that day. Other variables, such as the weather, are also included in this score.

The photos of plant location that are currently in bloom need to be validated before they are added to the map in the app. Currently this is being done by two biology professors who check new entries regularly. The data is open after validation and can be accessed by any user via their website.

How does Planttes realise impact?

Planttes can realise impact in two ways: by improving the health of people with pollen allergies and by learning people about plants. Their goal in the coming years is to regularly give presentations at schools, so that kids can make the photographs for the app and learn to recognize certain plants, following their development along seasons and specially during the blooming periods.

Currently, the pollen information system from the Point of Information on Aerobiology is very useful and includes an important number of plants and fungi (around 700), but the number of localities studied is insufficient for covering all the territory and there it comes Planttes, bringing the opportunity to citizens to show the reality of the blooming of certain allergenic plants at ground level where they develop their activity. **The app has been downloaded more than 1000 times so far and the websites gets visited by around 65,000 unique visitors annually**.

Atlas Okolja: everything you want to know about Slovenia in one map

Atlas Okolja in a nutshell:

- **Service:** Atlas Okolja (or: Environmental Atlas) presents a map of Slovenia. The map combines information from a range of different sources, such as noise-pollution, air-pollution, earthquakes and Natura 2000 areas.
- **Sector:** environment, government
- **Country of origin:** Slovenia
- **Data sources:** open data from government bodies (e.g., cadastral, environmental)
- **Number of employees:** 2-3
- **Website:** gis.arso.gov.si/atlasokolja

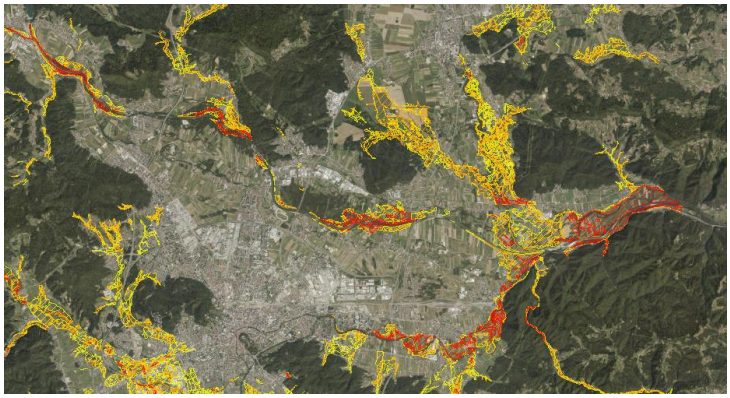
Atlas Okolja (Environmental Atlas in English) is a web tool for spatial data that was launched in 2008. The initiative is run by the Slovenian Environment Agency and **combines geo data from Slovenia with other data sources to add information to the map of Slovenia.** Examples of data sources that can be found in the Atlas are mean temperature per region, average snow cover, noise-pollution and maps for seismologic risks. The website helps citizens, city planners, insurance companies and researchers in making decisions, such as where to build new housing.

What services does Atlas Okolja offer?

The Atlas Okolja helps Slovenian citizens to find information about their country. The website provides a **satellite picture of Slovenia and provides users with a set of so-called 'layers', that can be draped over the Slovenian map.** To give an example: the figure below shows the flood risks in and around Slovenia's capital Ljubljana.

The Atlas helps citizens, policy makers and entrepreneurs alike to make important decisions about land use in Slovenia. For instance, citizens that are considering buying land to build a new house. The Atlas data provides them with information to know whether the new place is flat enough to build on and whether their new house would be quiet and peaceful using noise pollution data. Moreover, city planners use data to see where restrictions for possible new housing exist. For instance, Natura 2000 areas and flood risks. Lastly, academic researchers use the data from Atlas Okolja for their own analyses.

Figure 27. Satellite picture of Ljubljana with flood risks highlighted in red, orange and yellow, created on Atlas Okolja



What data does Atlas Okolja use?

Atlas Okoja uses different kinds of data that can all be connected with GIS data. Atlas Okolja shows information from:

- **Cadastral data** (e.g. addresses, streets, property sizes);
- **Environmental data** (e.g, water quality and air pollution by heavy metals);
- **Climate data** (e.g. air temperatures, wind speed and plant phenology);
- **Infrastructure data** (e.g. annual average daily traffic per road);
- **Water data** (e.g. flood hazard maps and information about the groundwater);
- **Nature data** (e.g. protected areas and Natura 2000 zones);
- **Land and Soil data** (e.g. soil pollution);
- **Earthquake data** (e.g. earthquake catalogue and maps of seismologic risks).

Part of the data used for Atlas Okolja is collected and published by the Slovenian Environmental Agency, but for large parts of the data the Slovenian Environmental Agency needs to reach out to other Slovenian agencies and ministries. The cadastral data for instance, is collected by the Surveying and Mapping authority and the information about flood risks is created by the Slovenian Water Agency.

The data received from other agencies is delivered in a standard format to minimise the time spent on combining all different datasets.

All data used is openly available, but the website currently does not have a download functionality. To actually download the data presented on the satellite picture, you need to visit the website of the government agency or the Slovenian open data portal.

How does Atlas Okolja realise impact?

Atlas Okolja serves citizens, policy makers, insurance companies and many other individuals and organisations. **Currently Atlas Okolja has 1200 visitors per day.**

The Atlas does not have a dedicated feedback area, but it does get emails regularly, informing them about usability issues that can be improved.

Future updates are already in the works: in a new version users will be able to share the map they created with others via an URL and more precise measurements of elevation data per square meter will be added to create an even more detailed picture of Slovenia.

Plume Labs: the French start-up making air quality information accessible and empowering

Plume Labs in a nutshell:

- **Service:** Plume Labs is a French start-up recently acquired by Accuweather that uses open data to forecast air quality globally.
- **Sector:** environment, health
- **Country of origin:** France
- **Data sources:** open data from local authorities, EU insitutions and further sources
- **Number of employees:** 22
- **Website:** plumelabs.com

Plume Labs is a start-up that was founded in 2014 by the French engineers Romain Lacombe and David Lissmyr to raise awareness about air pollution as a global health threat and help fighting against it. With this aim in mind, **Plume Labs focuses on bridging the environmental information gap by making more reliable and accurate information and forecasts on air quality available globally.** The start-up, which mainly only relies on open data to develop its products, has been recently acquired by the U.S. company AccuWeather, a former client specialised in weather forecasting service worldwide.

What services does Plume Labs offer?

The point of departure for Plume Labs is that **reliable air quality information is not easily accessible**. In fact, quality monitoring has traditionally been driven by local governments and agencies, leading to air quality monitoring stations being unevenly distributed around the world and therefore to many individuals being excluded from this key information. At the same time, **local data on air quality is often hard to gather and to interpret**, which further challenges the ability of citizens to be properly conscious of their local situation and makes difficult for governments to take action.

To respond to these availability and accuracy challenges, Plume Labs has focused on the development of air quality sensors on the one hand and on the forecasting of air quality in major cities through Copernicus data and other open data sources on the other. More specifically, Plume Labs currently offers three main products:

1. A **marketable device** able to provide users with an estimation of their exposure to air pollution;
2. A **free-of-charge and add-free mobile application** showing the level of air pollution based on users´ choice of location;
3. An **API** that businesses interested in air quality data for their commercial products and evaluations can buy to access data in an automated manner.

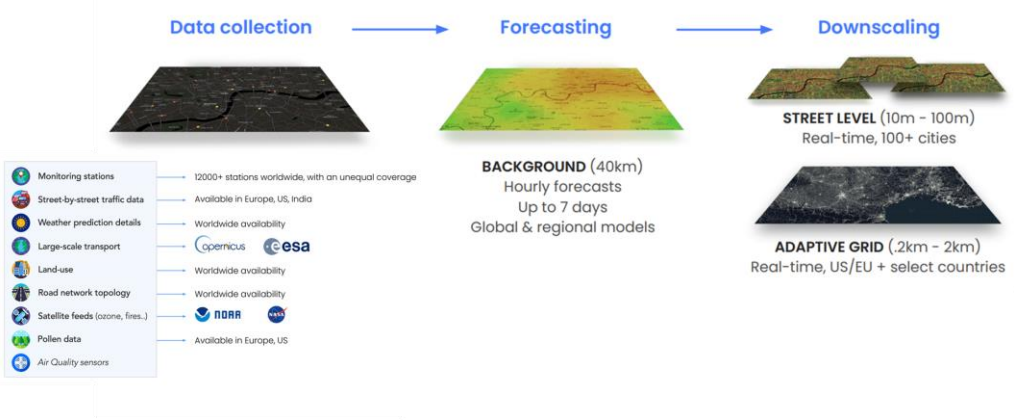
What data does Plume Labs use?

Plume Labs´ products are almost completely based on open data, except for traffic data that comes from a private data provider. Among the open data, many different sources are leveraged, including local authorities for air quality monitoring stations, Copernicus API for global and EU air quality forecasts, NOAA (US National Oceanic and Atmospheric Administration) for weather forecasts, OpenStreetMap for road network and classification as well as EU open data website for urban areas

and land use. This data – which is hourly updated – refers to parameters of air quality such as wind speed and direction, precipitation, temperature, humidity, heating emissions, traffic, land-use, pollen etc.

Based on this data, **Plume Labs trains geospatial AI and Machine Learning models to produce the most hyperlocal maps and forecasts of air quality across cities around the world.** More specifically, after collecting the relevant data from the various sources, Plume Labs´ team uses datasets based on historical data to create the model and inject the most recent data into the model to predict the air quality level. Subsequently, a downscaling of coarse resolution forecasts is performed up to the street level. This allows to improve the focus on relevant air quality information and be as precise as possible in terms of location, which would not be possible without the open data.

Figure 28. Plume Lab´s forecasting process



How does Plume Labs realise impact?

In the past eight years, Plume Labs has been able to expand its air quality forecasting **from 60 cities to the entire world.** Currently, the start-up has **dozens of direct clients** and through AccuWeather has acquired other **hundreds of additional indirect client organisations**. In terms of end users, Plume Labs seems also to have a good impact, with the mobile application product rating **4.2 and 4.7** out of 5 on the Play store and the App store, respectively. In addition to this, given the high accuracy – proven through several comparisons of performance with competitors and an ad-hoc accuracy evaluation framework – Plume Labs´ products are also **helping to advance the scientific research on air pollution** of major institutions such as Harvard University, University of Cambridge, Columbia University or Imperial College London.

Thanks to the recent acquisition by AccuWeather, in the coming years, Plume Labs expects to **further strengthen its global reach and extend its expertise on new forecasting models based on open data.** For instance, the team plans to develop a forecast team model to predict **burning fire evolution** in space and time. Parallelly to this, the start-up also envisages to forecast the **wildfire smoke dispersion** to be able to trigger alerts and warnings to potentially impacted people.

Baltazar: helping Croatians and tourists in Croatia to find swimming spots with clean water

Baltazar in a nutshell:

- **Service:** Baltazar measures water quality on beaches in Croatia. The data is further enriched with information about air temperature, wind speed and beach facilities.
- **Sector:** Environmental
- **Country of origin:** Croatia
- **Data sources:** open geodata
- **Number of employees:** n/a
- **Website:** vrtlac.izor.hr

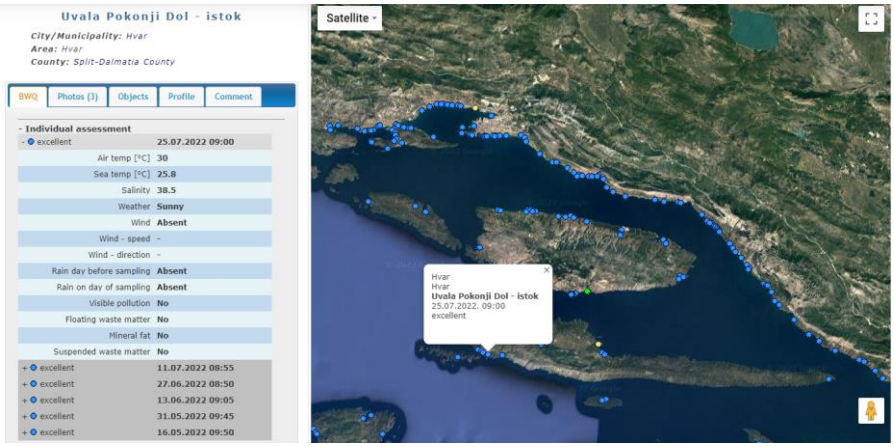
The application Baltazar was developed to **provide insight into the water quality on beaches,** e.g., if water in certain areas is suitable for swimming**, and to increase awareness of the connection between environmental sustainability and water quality**. Moreover, Baltazar provides important information to beachgoers about the facilities on beaches in Croatia. Lastly, the data collected by Baltazar is published as open data to enable re-use by NGOs and private organisations.

What services does Baltazar offer?

Balatzar was launched by the Croatian government to better inform citizens and tourists about the water quality around the Croatian beaches. The goal is twofold: both to create a water quality database to comply with the Croatian directive on sea bathing water quality that is also suitable for re-use as well as **providing an easy-to-use web interface where users can find regularly updated information about sea water quality**. Recently, Baltazar also created a mobile app so users can easily find the water quality on beaches on their smartphones.

Baltazar contains data for over 1000 beaches. The water quality is colour coded as either excellent, good, sufficient or poor. Baltazar also provides information about the air temperature, sea temperature and the profile of the beach, for instance. Moreover, there's data on parking spots, hotels, nearby restaurants and trash bins. In short everything needed for a nice day on the beach.

Figure 29. Water quality and other information about one of the Croatian beaches



What data does Baltazar use?

Baltazar uses open geo data to show the beaches on a map. The data about water quality is collected by microbiological researchers that visit each of the more than 1000 locations regularly and is sampled every two weeks. Furthermore, open data from meteorological stations is used to show the air temperature and wind speed on specific beaches.

Other data on Baltazar, such as the location of trash bins and the availability of parking spot, is collected by the Baltazar-team by zooming in on satellite photos to identify objects (such as trash bins), and by users who can share photos and comments about a beach on the website.

Baltazar is currently the central point for data provision of water quality data in Croatia. **The data they collected and enriched with open data is used by several NGOs to evaluate the water quality** in Croatia and by private organisations to create services that inform users about beach facilities.

How does Baltazar realise impact?

Baltazar helps citizens and tourists to choose safe places to swim, but the precise positive impact that Baltazar has on public health has not been estimated. The website was used by **over 260,000 unique visitors between May and August 2022**, of which 244,000 used the website in Croatians and 16,000 used the English version.

Baltazar uses the feedback they receive from users to keep improving their services. For instance, users often propose to start measuring on new locations. Baltazar assesses these requests and sometimes adds the new beach to the data. Users can also comment which features are not working properly on the website, which can then be addressed by the team from Baltazar.

Environ-Mate: the German platform empowering kids with knowledge about climate change

Environ-Mate in a nutshell:

- **Service:** Environ-Mate is an interactive platform to empower children with knowledge about climate change based on scientific data.
- **Sector:** environment, climate
- **Country of origin:** Germany
- **Data sources:** open data from EU and international bodies (e.g., Eurostat, EEA, NOAA)
- **Number of employees:** 4
- **Website:** environ-mate.feld-m.de

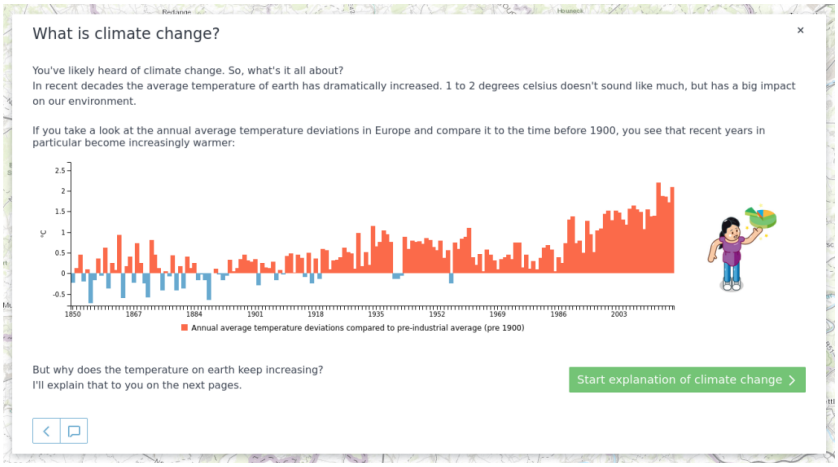
Environ-Mate was developed in 2019 by Dr. Matthias Böck, Bernhard Janetzki, Alexander Merdian-Tarko, and Paul Schlumbom. To respond to the 2019 EU Datathon challenge ´Tackling climate change`, the German team developed an interactive web-based application that **explains climate change to children between 10 and 14 years and encourages them to become engaged in fighting against it.** The application is completely based open data from the European Environment Agency (EEA), National Oceanic and Atmospheric Administration (NOAA), Eurostat, Copernicus, and international disasters database (CRED EM-DAT) and its source code is available on Github.

What services does Environ-Mate offer?

Aware of the devastating consequences of climate change, leveraging the huge amount of data about it, and in light of the growing activism among young people, the Environ-Mate team decided to create a **web-based application able to educate children about climate change and means to act.** Today, Environ-Mate is an interactive and intuitive platform which uses scientific data to teach children and young adults about the causes and effects of climate change.

More specifically, the user is accompanied throughout a journey about **various statistics in reference to their own home country in Europe.** Information provided relate to what is exactly climate change, what types of greenhouse emissions exist, where do these gasses come from, how are countries in Europe doing with respect to each other, what are the main consequences of climate change, as well as what can individuals do to prevent it. To sum up, Environ-mate is guided by a double principle of learning and acting.

Figure 30. Environ-Mate: ´What is climate change?`



What data does Environ-Mate use?

The platform offers recent and reliable information on climate change in a specific country and the whole of Europe. This **data is completely open** and comes from the EEA, NOAA, Eurostat, Copernicus, and CRED EM-DAT.

Besides the cleaning and harmonisation of the data, the team also used a digital elevation model and greenhouse gas projections to provide insights on the annual average temperature increase, GHG emissions per country and sector, the comparison of GHG emissions across EU per capita, total and per sector, the GHG emissions per country over time, the sea level rise forecast map, the extreme weather occurrences, and the projections on temperature increases.

How does Environ-Mate realise impact?

The Environ-Mate team has not implemented any tracking in its web application to be compliant with legal and privacy regulations, especially since the target group consists of children. Yet, the platform was evaluated through qualitative surveys and received positive feedback from several individuals, including during the EU Datathon 2019. In general, the idea behind Environ-Mate appears to provide some value to the target group although there is certainly room for improvement considering the recent fierce competition on the internet.

For the future, the team has some ideas for further development and next steps. For example, they would like to **test Environ-Mate in schools and learn from this feedback, do a climate expert audit, optimize accessibility features for people with disabilities, and extend stories** (e.g., by providing more details on biodiversity, region-specific topics, and having a greater global coverage). They are also considering **offering the platform service in further languages** (FR, ES, IT, PL). The implementation of these ideas will however depend on the time and resources of the team members next to their professional and private responsibilities.

4. Learnings from the four dimensions

Economic impact

Re-use cases create economic impact in different ways. The organisations **C4P and YouthPop** use data from the European Commission's tendering portal TED. Currently, some organisations struggle to find tenders that suit their needs and qualities on the portal. C4P and YouthPop analyse the open tendering data and present the most promising opportunities to their clients. In doing so, they established a business model for themselves, while improving the match between organisations looking for opportunities and the EU-institutions that put the tender on the market.

Wonder Wanderlust Women and Naar Jobs in West-Vlaanderen both use open data to help people find a job and place that suits them, although their targets groups are different. Wonder Wanderlust Women aims to support young women in their personal and professional growth, whereas Naar Jobs in West-Vlaanderen helps people that are currently unemployed in finding a job that they can reach with the transport options available to them. Together, the initiatives show how open data can bridge gaps in the labour market that are currently left unaddressed.

Lastly, **LocalFocus** curates datasets for journalists. Local Focus collects the open datasets that are most newsworthy and present these datasets to journalists. This increases the impact of these open datasets substantially, because journalists sometimes have trouble to find their way in all available open datasets. In the data life cycle, they play the part of the open data intermediary. LocalFocus also offers their users multiple analyses per month and provides them with a visualisation tool, to further increase the journalistic impact of their stories.

Governmental impact

Re-use cases that have a governmental impact often improve political transparency in countries. For instance, the Norwegian **Statsregnskapet.no** is part of a government agency and collects open data from multiple government sources to create visualisations of government spending, informing taxpayers on where their money goes. **Openpolis** provides several similar services. For example, they provide open insight into the balance sheet of Italian municipalities and updates of the implementation of the Italian Recovery and Resilience Plan. The Georgian initiative **IDFI** also makes governmental data available to the public. Additionally, they also pressure their government to make more data open. The idea is that it is only a transparent government that can be held accountable.

Another example of governmental impact is **Where is my polling station?** as it helps people find a voting booth close to them that suits their needs regarding accessibility. Open data is thus used to broaden political participation and in turn strengthen democracy. A similar example is **Next Generation Democracy**, which keeps a democracy technology database, develops an online ranking of the performance of Member of the European Parliament, and continuously identifies opportunities to leverage technology for more democratic societies.

By using network analysis to visualise the evolution and interconnectedness of case law, **The Smartfiles Network** not only revolutionises the world of PDFs but also makes legal text and key court decisions easier to grasp by citizens and to act on by policymakers. In a similar way, the **3D city model** of the city of Aarhus makes use of data-driven visualisation technology to facilitate the decision-making process of the municipality when it comes to climate adaptation, green conversion, urban planning, land management and much more.

Social impact

Open Food Facts shows how opening up data can lead to real impact. Their open data (of over two million products) was partly created by foodies that would upload product labels with the ingredients. Open Food Facts popularised the NutriScore (i.e., an easy-to-understand number that tells you the nutritional value of a product) in France to the point that large food producers cooperate with them to make their products healthier and improve public health.

Other re-use cases that contribute to public health are **Medicatio**, which provides a database of approved drugs that patients can use to better understand the care they're receiving; the application **EV-app** that shares the location of people suffering from a cardiac arrest with the most nearby first aiders, thus decreasing the chance of death or brain damage; **Hale & Hearty** that uses open data to stimulate Irish citizens to start a healthier lifestyle; **Open Active**, which created an easy way to find nearby sporting locations; **VisImE-360** that helps raising awareness and improving decision-making in relation to visual impairment; and **UniversiDATA Lab** that offers an interactive repository of analytical applications of research in higher education in Spain.

Tangible data uses open data to let people experience the data. They want to make large data sculptures that can be placed in front of government buildings instead of complex dashboards that are only understood by few. Tangible data's impact is to challenge fake news and to provide accurate information to people with little digital skills.

In a similar way, **EU Twinnings** uses open data in an exploratory way, allowing a wider audience to access Eurostat statistics and showing with interactive graphs the degree of similarity of EU regions.

Lastly, the re-use case **Integreat** provides information about German municipalities in several languages to help newly arrived migrants and refugees to integrate in the new society.

Environmental impact

Multiple re-use cases used open data to monitor the air quality and inform (vulnerable) citizens accordingly. Nevertheless, what they measure differs: **Air Quality Cyprus** measures pollution from industries or nearby deserts; **Planttes** monitors which plants are in bloom; **Plume Labs** uses satellite data from Copernicus to predict air quality in several cities; **Baltazar** uses data on air temperature and wind speed to measure water quality on beaches.

Open data plays an important role in preserving nature and protecting the planet. **Digital Forest Dryads** tracks illegal deforestation with open aerial data and **Vides SOS** can be used to alert State Environmental Service of environmental hazards such as pollution, waste, and litter in nature. **Atlas Okolja** informs Slovenian citizens about noise-pollution, air-pollution, earthquakes and Natura 2000 areas in their country.

Finally, the environmental impact of **Environ-Mate** passes through the 10- to 14-year-old children that the platform tries to educate on matters pertaining climate change and means to act.

5. Conclusion

The Use Case Observatory monitors 30 re-use cases over the course of three years to assess how impact is created with open data, to share challenges and achievements of open data re-use cases, and to add to the debate on an open data impact assessment methodology.

An extensive procedure was followed to select the most relevant re-use cases for this research project. Drawing from the Open Data Maturity (ODM) assessment the EU Datathon and data.europa.eu use case repository, 600 interesting re-use cases were collected. A relevant sample was chosen to balance the number of re-use cases between different countries and between different impact domains (economic, governmental, social, and environmental). The last criterium was whether the re-use case benefitted disadvantaged groups in society or contributed to the European Commission's policy priorities for 2019-2024.

The interviews with the re-use cases clearly show the myriad of ways in which open data re-use cases have impact. To name a few: with open data new business models are established, people are helped to find jobs close to them, citizens can better understand how their Member of Parliament´s and their government operate through improved transparency, people suffering a cardiac arrest see increased survival rates and children are empowered with knowledge about climate change.

At the same time, estimating the impact of these re-use cases is a complex challenge. For many re-use cases it remains unclear how to precisely measure their services' impact. An organisation like Open Food Facts contributes to the public health by providing citizens with simple to understand information on the nutritional values of products. However, how much they contribute to public health – which is often measured in quality adjusted life years (QALYs) – would require extensive research. Hence, most of the re-use cases measure their impact with web statistics: the number of unique visitors serves as a rough proxy for the impact that is created by the re-use case.

Another challenge in estimating the impact of open data re-use cases is that not all information can be shared easily. Sharing precise information about the revenue or the number of clients could be a risk for SMEs that use open data in their business model, since competitors could use that information to their advantage. This is different from public sector institutions and non-profit organisations, who are freer in sharing information that is available to them.

In each of the interviews was also asked what plans they have for the near future. In other words: how will they continue to realise impact? The ideas in this regard differ from only small changes to impressive ambitions. However, a common challenge for both small and big plans seems to be finding appropriate investments. While finding the resources to create the re-use case or a first prototype is feasible, obtaining the funding to scale the re-use case is not so straightforward. Therefore, some of the use cases are struggling to keep moving forward.

Overall, this first report highlights the power of open data re-use. Without open data, most organisations and applications mentioned in this report would have never existed. At the same time, however, the results indicate the need for a further unlocking of the open data potential, allowing its re-use to have a clear impact on our economy, government, society, and environment. While this requires to further support the community of re-users in the identification of financial opportunities for growth, it also entails a better understanding of how open data impact is created and measured. The Observatory aims at achieving this understanding, and with this first report it has laid the foundations for continuing this journey. The idea is to use the insights of the first report as a benchmark

for a second and third analysis that will be published in 2024 and 2025. With respect to this first report, which introduces the 30 re-use cases monitored, the second and the third will focus more on evaluating the progress made. Moreover, more emphasis will be placed on ascertaining achievements and challenges in a period of three years and extrapolating concrete insights to improve methodologies of open data impact assessments.

Annex I – List of interviewees

Nr	Re-use case name	Interviewee	Contact
1	the Smartfiles Network	Veronika Haberler	vh@lereto.at
2	3D city model	Marianne Knudsen	maknu@sdfi.dk
3	Waar is mijn stemlokaal	Jesse Renema	jesse@openstate.eu
4	OpenPolis	Vittorio Alvino	fondazione@openpolis.it
5	Next Generation Democracy	Michael Birkebæk Jensen	nextgenerationdemocracy@gmail.com
		Kristian Thorsted Madsen	
6	Statsregnkapet	John André Jakobsen	john.andre.jakobsen@dfo.no
7	IDFI	Teona Turashvili	t.turashvili@idfi.ge
8	Medicatio	Willy Duville	willy.duville@medicat.io
9	UniversiDATALab	Juan Jesús Alcolea Picazo	jjalcolea@dimetrical.es
		José Arbues Bedia	jarbues@ucm.es
10	ViSimE-360	Boris Bikbov	boris.bikbov@gmail.com
11	Open Active	Tim Corby	hello@openactive.io
		Howard Askew	
12	Tangible Data	Antonio Moneo	antoniomoneo@gmail.com
13	Hale & Hearty	Helena Campbell	Helena.Campbell@per.gov.ie
14	EU Twinnings	Giuseppe Sollazzo	puntofisso@gmail.com
15	OpenFoodFacts	Stéphane Gigandet	stephane@openfoodfacts.org
16	Integreat	Clara Barcklo	bracklo@integreat-app.de
		Fritjof Knier	knier@integreat-app.de
17	EV-app	Robin Arys	robin.arys@evapp.org
18	Digital Forest Dryads	Razvan Pistolea	razvan+europa@digital-dryads.eu
19	Air Quality Cyprus	Chrysanthos Savvides	csavvides@dli.mlsi.gov.cy
20	Vides SOS	Liene Alde	liene.alde@vvd.gov.lv
21	Planttes	Jordina Belmonte Soler	jordina.belmonte@uab.cat
22	Atlas Okolja	Primož Kogovšek	primoz.kogovsek@gov.si
23	Plume Labs	Boris Quennehen	boris.quennehen@accuweather.com
24	Baltazar	Damir Ivankovic	ivankovic@izor.hr
25	Environ-Mate	Alexander Merdian-Tarko	alexander.merdian-tarko@posteo.de
26	C4P	Andreas Thanopoulos	andreas@c4p.io
27	WWW by ITER IDEA	Sara Baroni	sara.baroni@iter-idea.com
		Guido Mazza	guido.mazza@iter-idea.com
28	YouthPop	Sofia Lousa	sofia@youthpop.eu
		Michail Maragakis	melidoni.michail@gmail.com
29	LocalFocus	Jelle Kamsma	jelle.kamsma@anp.nl
30	Naar Jobs in West-Vlaanderen	Han Tambuyzer	han@nazka.be

Annex II – Indicative interview questions

1. Can you briefly describe the **idea** behind your use case?
   a. What is its purpose?
   b. What is its target audience?
   c. What size is the team?

2. Can you briefly describe the **data** that was used for creating *x*?
   a. Is your initiative only based on publicly accessible data (open data)?
   b. If not, which other data sources were consulted?
   c. Where did you find the (open) data?
   d. What is its licence?
   e. How do you process open data? Any cleansing, structuring, manipulations, or modelling techniques?
   f. Would have been possible to develop your initiative without open data?
   g. If not, why?

3. Can you briefly describe the **impact** that *x* is having on its audience, with respect to its purpose?
   a. Do you monitor the performance of your website? For example, do you know the number of daily/monthly active users?
   b. Do you regularly collect feedback from users? Is this feedback proving a general satisfaction of users with the website?
      Si sta lavorando su un feedback button
   c. How has *x* been developing since your win/participation in the EU Datathon of 2020?
   d. How do you plan to further develop from here to the next two years? Is there any particular ambition or business projection that you would like to share with us?

4. Is there any **further information** that you would like to share with us?

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