



Digital Music Observatory

co-founder

[Reprex BV](#)

About

The [Digital Music Observatory](#) is a fully automated, open source, open data observatory that links public datasets in order to provide a comprehensive view of the European music industry. The DMO produces key business and policy indicators that enable the growth of music business strategies and national music policies in a way that works both for music lover audiences and the creative enterprises of the sector.

Its data pillars are following the structure laid out in the [Feasibility study for the establishment of a European Music Observatory](#)..

The Demo Music Observatory Pillars:

1. [Music Economy](#)

Target audience of app

Business strategists and planners who work with various key business indicators; Public and non-governmental policy-makers who work with various impact and effect indicators; Academic researchers; Data journalists; Open-source developers.

Tagline of the app (140 characters), which could be published later

The Digital Music Observatory is a fully automated, open source, open data observatory that creates public datasets to provide a comprehensive view of the European music industry.

Description of the app (maximum 250 words)

The Digital Music Observatory (DMO) is a fully automated, open source, open data observatory that creates public datasets to provide a comprehensive view of the European music industry. It provides high-quality and timely indicators in all four pillars of the planned official European Music Observatory as a modern, open source and largely open data-based, automated, API-supported alternative solution for this planned observatory. The insight and methodologies we are refining in the DMO are applicable and transferable to about 60 other data observatories funded by the EU which do not currently employ governmental or scientific open data.

Music is one of the most data-driven service industries where most sales are currently executed by AI-driven autonomous systems that influence market shares and intellectual property remuneration. We provide a template that enables making these AI-driven systems accountable and trustworthy, with the goal of re-balancing the legitimate interests of creators, distributors, and consumers. Within Europe, this new balance will be an important use case of the European Data Strategy and the Digital Services Act.

The DMO is a fully functional service that can serve as a testing ground of the European Data Strategy. It can showcase the ways in which the music industry is affected by the problems that the Digital Services Act and European Trustworthy AI initiatives attempt to regulate. It is being built in open collaboration with national music stakeholders, NGOs, academic institutions, and industry groups.

Project Plans & Readiness

Timeline for the Digital Music Observatory

2018-2020	Open-source statistical software to manipulate open data passes peer review on CRAN
September 2020	Semi-automated prototype, the Demo Music Observatory is launched based on 2000 music and creative industry indicators collected with 60 stakeholders in 12 counties.
October 2020	Observatory product/market fit validation in the world's 2nd ranked university-backed incubator of TU Delft and Erasmus University, the Yes!Delft AI+Blockchain validation Lab.
February 2021	The prototype automated music observatory is chosen to JUMP, the European Music Market Accelerator. Academic and policy use cases of our data.
March 2021	On International Open Data Day, our second observatory, the Green Deal Data Observatory is launched.
April 2021	Fist use case of the green deal observatory with a Belgian policy problem. Conceptualization of the third observatory, economy.
May 2021	Launch of our data API, separating the product team to developer team, data curator team, and service developer team. Submission to EU Datathon 2021 as Digital Music Observatory with daily, manual support as needed, and service flow adjustments. The output is growing from day one continously, but the application integration is not yet seamless.
June 2021	We solidify the automation between the critical elements: harvesting from Zenodo, harvesting from open data APIs, data-reprocessing with unit tests, dissemination in API and automatic documentation. We expect that our technology elements will work seamless by the end of the month. From a technical point of view, we reach maturity. From a business point of view, we are still prototype.
July 2021	Via our academic, policy and business partners we intensively recruit new data curators, and make available new indicators. We expect that our data observatory, as a data ecosystem of policy, scientific and business users starts to grow exponentially.
August 2021	Based on user feedbacks, we are improving the value proposition for three segments: policy users (public and NGO), academic users, business users.
September 2021	Finalizing the business model based on a hybrid licensing and hybrid revenue flow. We believe that our service is a mature project from this point.
November 2021	Feedback from EU Datathon 2021!

Legal & IP

- Our submission is an open collaboration among private persons, research organizations and an early-stage startup, Reprex BV, which is developing a business model to process open data with open-source software. We do not plan any changes in the timelines of the EU Datathon 2021. Our prototypes currently have no significant income, and we hope to receive little contributions from first users. These will be invoiced by Reprex, and current costs are expensed by Reprex.
- Reprex is supported by rOpenGov, which is a collaboration of R developers who write open source, peer reviewed software to access open data. Reprex's software were released together with rOpenGov. rOpenGov is hosted by the University of Turku, and their contribution to the project is in-kind.
- The development, data curator, and service development team members work in different organizations and their contribution is on a volunteer basis, and in-kind. They are not employed by Reprex, but Reprex pays some expenses (GitHub Action, Amazon AWS hosting.)

Technology and Freedom To Operate:

- We did not apply for a patent.
- We use only open-source technology, and we have complete FTO.
- Our critical components are released under MIT, GPL-2, or GPL-3 and similar licenses, and go through the quality control of peer review in releases, mainly on CRAN.

Business Planning

How do users are going to pay?

- We are aiming at the data acquisition budget of our public policy, NGO, consultancy and research institute clients, which is about 10-15% of their annual R&D spending ranging between €5k-50k.
- We also want to win public tenders of the EU, OECD and UN to run 'data observatories '. We want to keep as much as possible fully open and free.

What is the users ROI (rate on investment)?

- For a research-oriented organization, they get 2-4x times more data with us, but how this translates to a research product / research (wage) cost is being quantified in our pilot projects.
- The ROI is differently defined for a public policy organization, an NGO, a business consultancy or a scientific research organization.

What are your costs?

- Our server costs were won in the Yes!Delft incubator from Amazon and paid from the Reprex account. Github automation costs are paid by Reprex.
- So far, almost all our costs are fixed personnel costs, and all our team members work for free on a volunteer basis.
- In our current competition setup, all contributors are volunteers, and we try to get from users a small budget for small expenses. These will be handled by Reprex.

Technical Readiness Level

Technical readiness level:

- Different components are on levels 5-8.

- Our technological innovation lies in re-processing already existing public sector data, and mapping data sources, which enables us to create new and affordable features for AI apps.

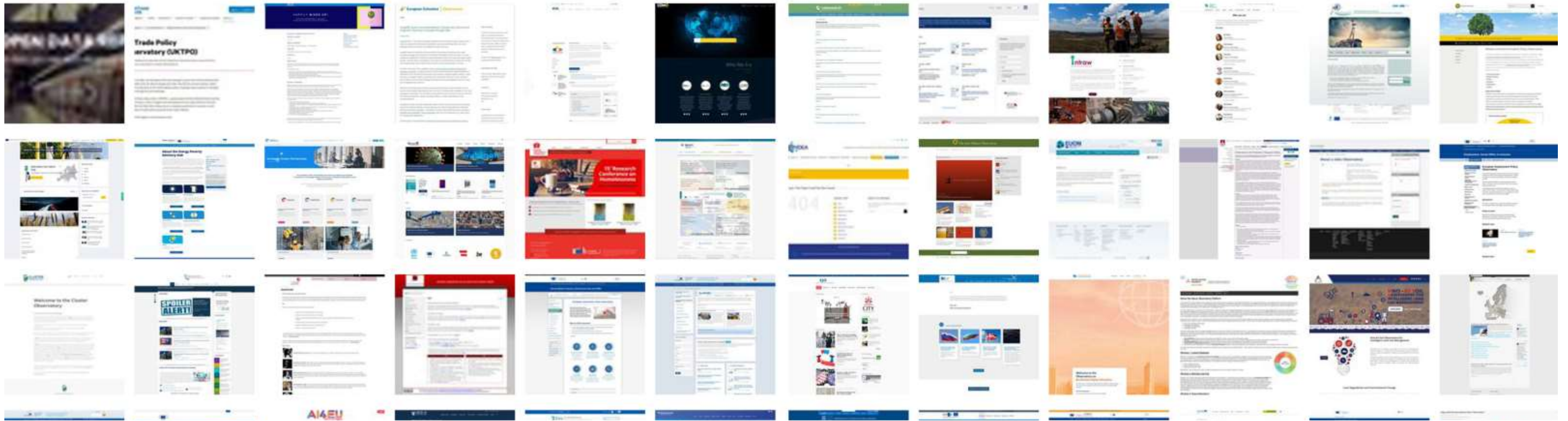
- We have passed TRL Level 5, and our prototypes are working in isolation. They are being tested as a seamless service flow now.

- We only use open-source technology which usually overstates TRL Levels. We use others' work, and contribute, too, our critical components are peer-reviewed statistical software releases. This makes our TLR higher than our business readiness.



Why is open data not trusted?

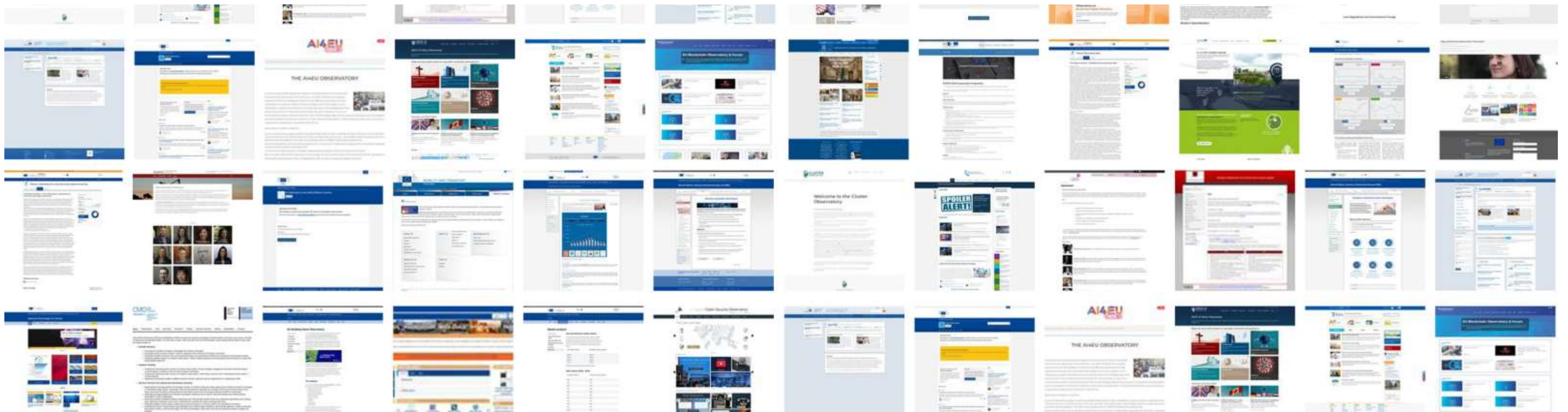
Why is Open Data Not Used?



- Though data is usually valuable if it is not in isolation, open data is very difficult to join with other data. Almost never confirms the tidy data principles, which makes integration into databases or making composite indicators a very challenging data processing task.
- Haphazard use of measurement units (gram vs kilogram), currencies, metadata codes (regional boundaries change several thousand times just in the EU over a few years.)
- In short: open data requires investment into processing, unit testing, documentation to be usable. These are very costly operations, but we believe it can be done at scale and at a best value for money with open-source statistical code and research automation. This is what we do: create automated data observatories that reprocess, validate and automatically document open data to meet high statistical standards.

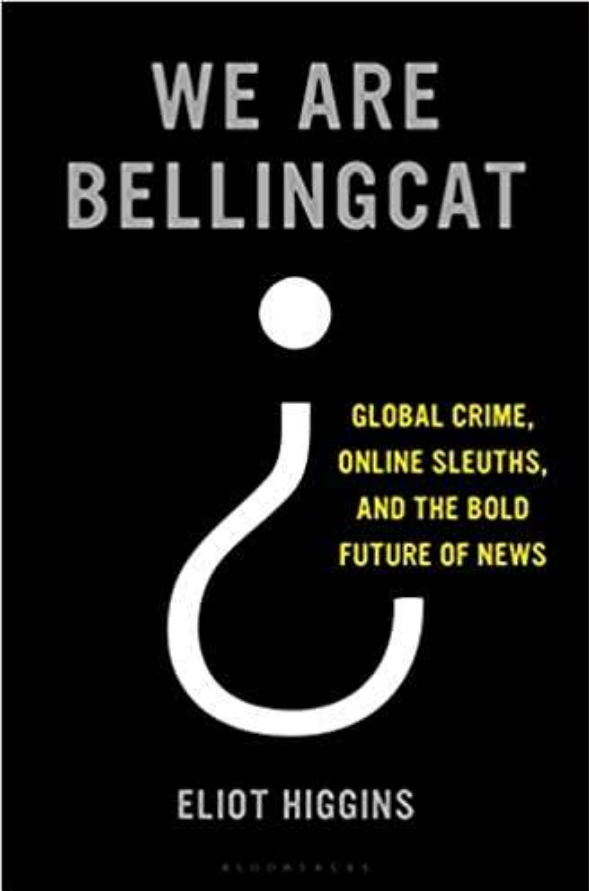
Why is Open Data Not Used?

- Open data is released after primary governmental, scientific or corporate use. It is not processed and organized to the new user's needs.
- The data is poorly documented, the primary user does not have an incentive to hire a data scientist or statistician to provide important metadata for the information: it needs to be reverse engineered to figure out important aspects of the data.
- The EU, OECD, and UN bodies are (co-)financing more than 60 permanent data collection points, so called '**observatories**' or '**data observatories**'. Our market research found they almost never use any form of open data. We believe that it is a wasted opportunity to spend millions of euros on each data observatory's collection problem when billions worth of open data (at historical cost) is not even considered in them.



How can we build up the missing trust?

OSINT & Open-Source Market Research



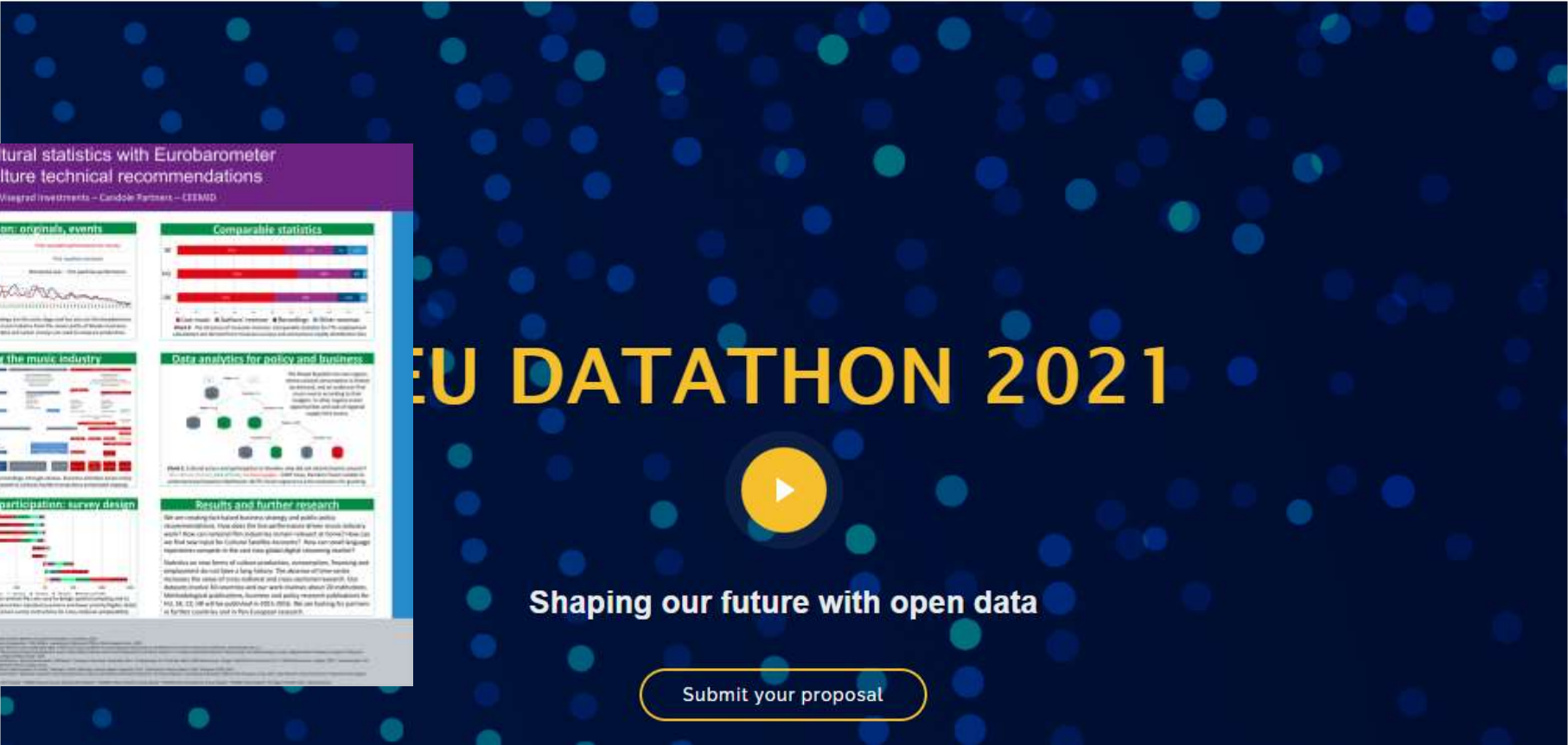
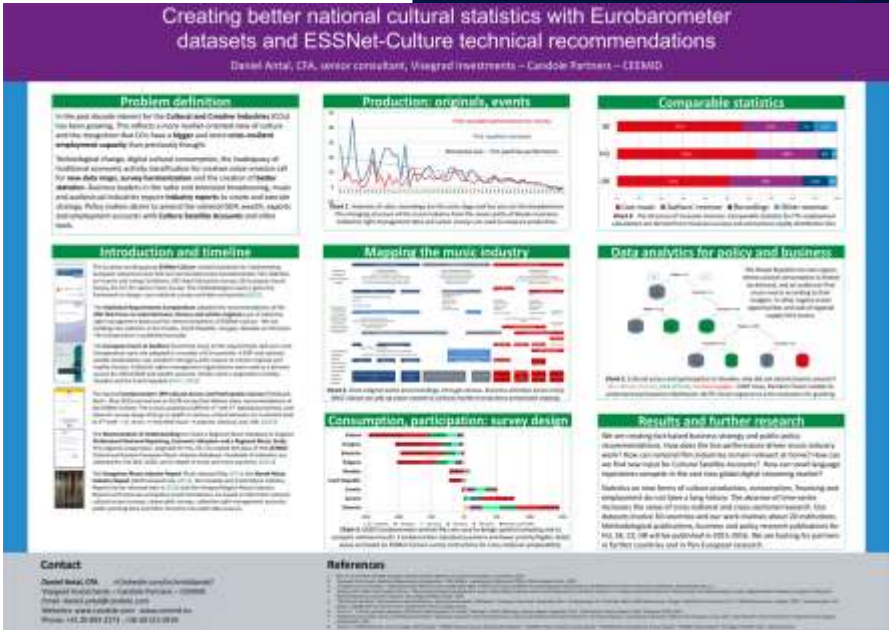
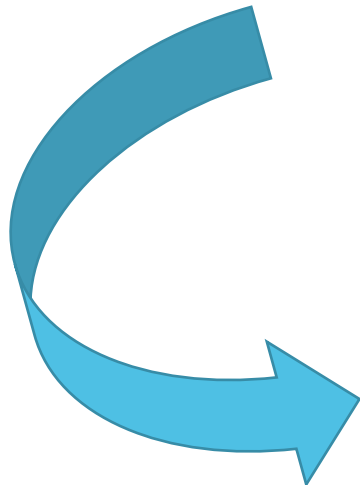
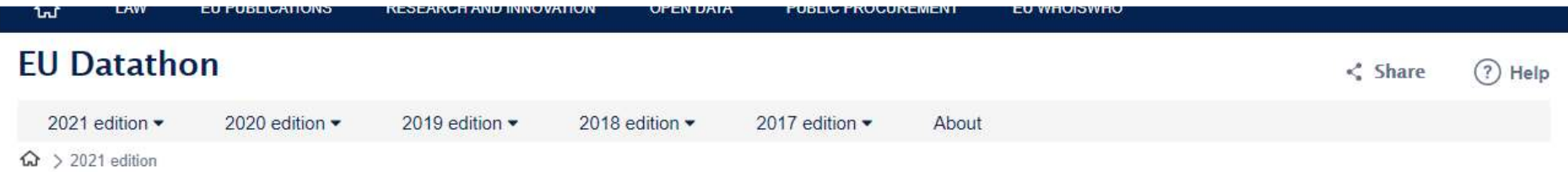
MIIT7 Russia
Stunt Geolocation - Verifying the Unverifiable

MIIT7 Russia

MIIT7 Russia
Geolocating the June Rus
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We do what **bellingcat** does with open-source intelligence in journalism: programmatically sift through vast mountains of open data and try to select and verify those that meet high business, scientific or policy evidence standards.



Accuracy & Reliability

- 1 . Our curators design unit-test and other other tests to check the accuracy and reliability of our indicator before release.
2. Our currators send the data products in-context peer review in their domain.

- 1 . Our statistical software code contains many unit-tests to avoid reliability issues.
2. Our processing code goes through scientific software peer-review.
3. The authoritative copy/version is stored on Zenodo with DOI/version.

Timeliness & punctuality

- 1 . Our curators help us find frequently updated data sources.
2. We aim to design leading indicators that accurately forecast the expected measurement.

1. We use research automation: or code collects new data, revisions every day, and re-processes the data.
2. Our API immediately releases the new data.

Coherence & Comparability

- 1 . Our curators are selecting data and designing indicators that can be joined with all other indicators in our observatory.
2. We make sure that the timeframe, unit, currency, and other aspects make the data comparable.

- 1 . Our software + API fully embraces the tidy data concept,. It makes integration with all our data, and other databases easier and less likely to cause logical errors.
2. We aim for a large cross-section of observations (all Europe), timeframe, and several indicators for cross-comparison.

Accessibility & Clarity

- 1 . Our curators place our data in scientific publications, open policy analysis, and business use cases to make sure that they they makes sense.
2. Our open collaboration method offers user feedback from academia, public and NGO policy and business users.

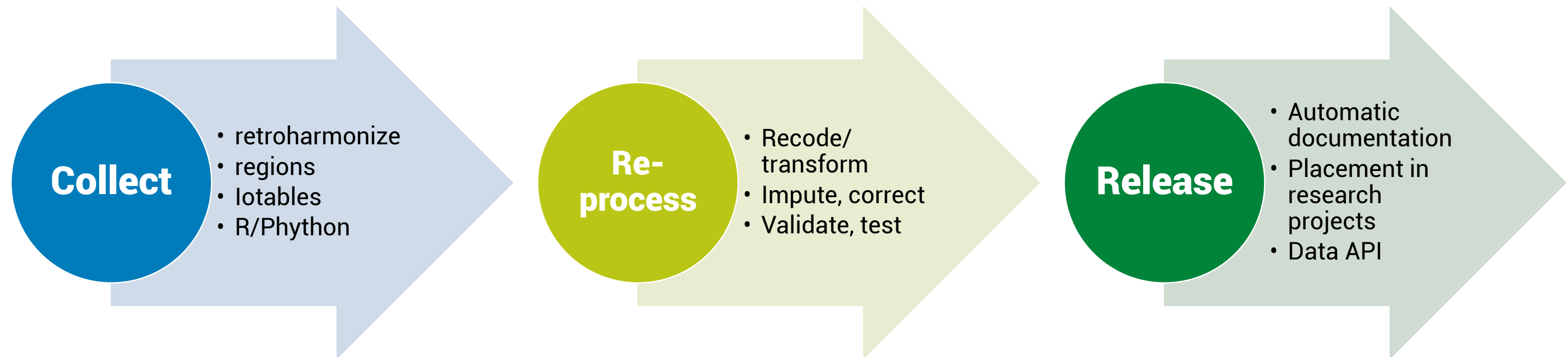
- 1 . Our API contains a daily refreshed full set of our indicators (we aim at 100-200 indicators in the observatory)
2. Our documentation website is automatically refreshing the indicator description, the data overview and the latest metadata (new observations, new imputations, etc.)

We aim to increase the quality of existing open governmental indicators, such as Eurostat products, and to design new indicators that are at least on the quality level of Eurostat's products. Our quality assurance follows the following methodology.

1. Towards a harmonised methodology for statistical indicators – Part 1: Indicator typologies and terminologies - 2014 edition ([pdf](#))
2. Towards a harmonised methodology for statistical indicators – Part 2: Communicating through indicators ([pdf](#))
3. Towards a harmonised methodology for statistical indicators – Part 3: Relevance for policy making ([pdf](#))

What is our technology?

Technology – panning out gold from muddy open sources

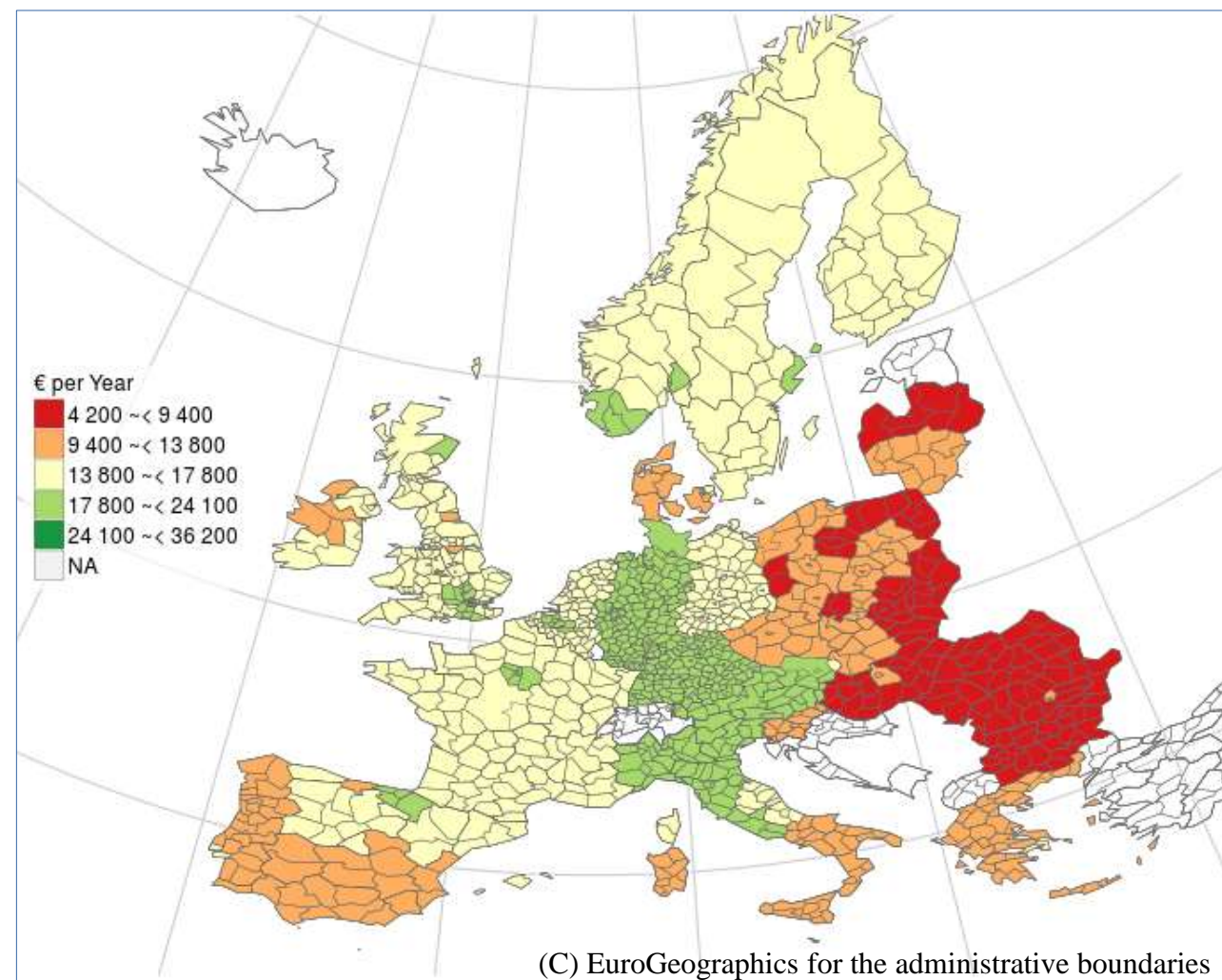


Our retroharmonize, regions and iotables software has each about 1000-2000 specialist users worldwide. The users are potential collaborators to pan out more open data and potential clients to produce high-quality research products.

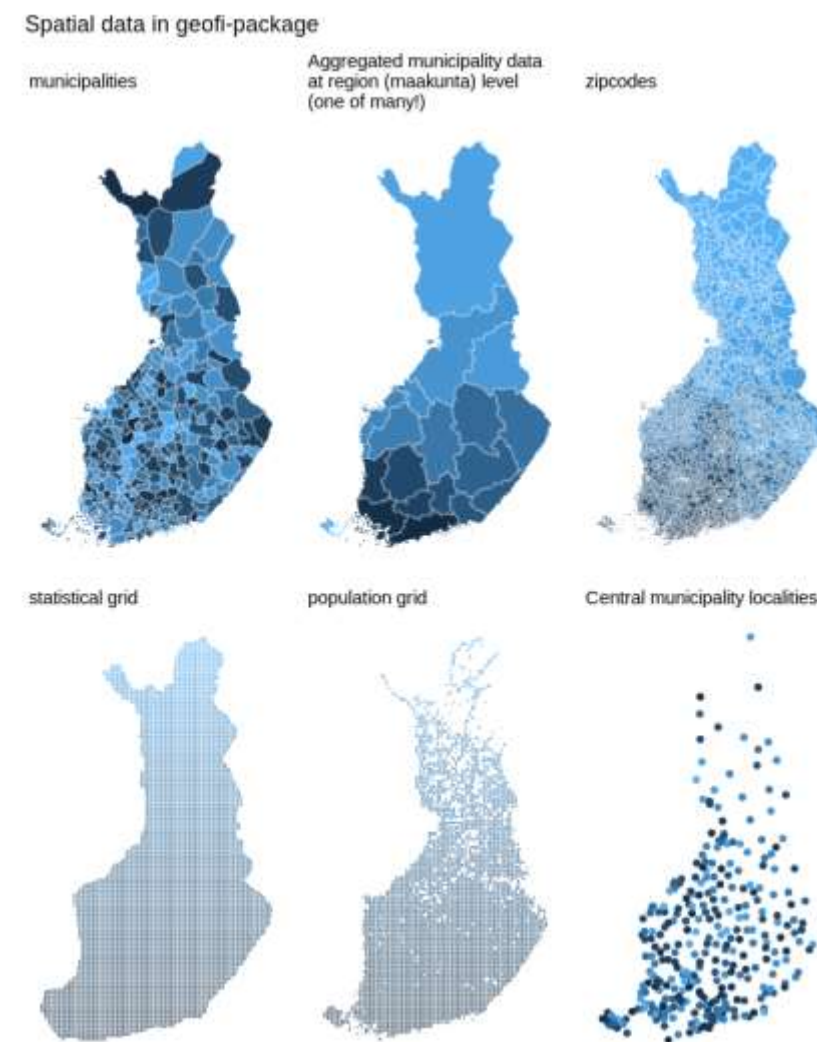
Retrieval and Analysis of Eurostat Open Data with the eurostat Package

by Leo Lahti, Janne Huovari, Markus Kainu, and Przemysław Biecek

R Journal 9(1):385-392, 2017

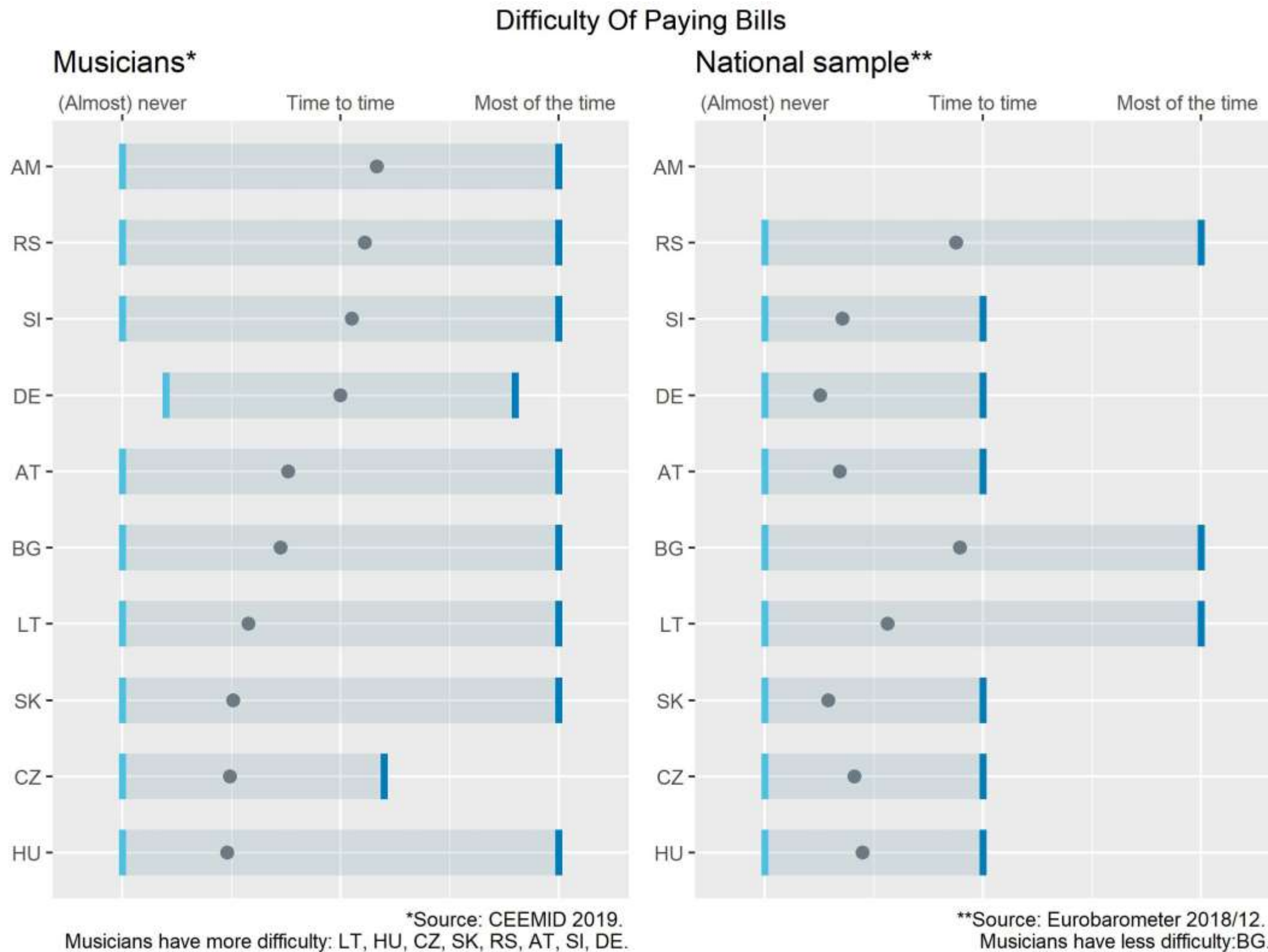


Eurostat open data: average household expenditure in 2011



- Open developer network for open government data analytics in R
- 30 R packages in various stages of development; 10,000+ downloads/month
- Launched at the NIPS Machine Learning open-source software workshop 2013
- Active developers from 5 countries; coordinated by University of Turku, Finland
- This is a compilation of mature R packages that collectively provide tested tools to retrieve, refine, enrich, integrate, and analyse open government data from Eurostat, national statistical authorities, geospatial information, and other sources
- Seamless incorporation of open data streams with state-of-the-art statistical and probabilistic programming techniques and reproducible data science workflows

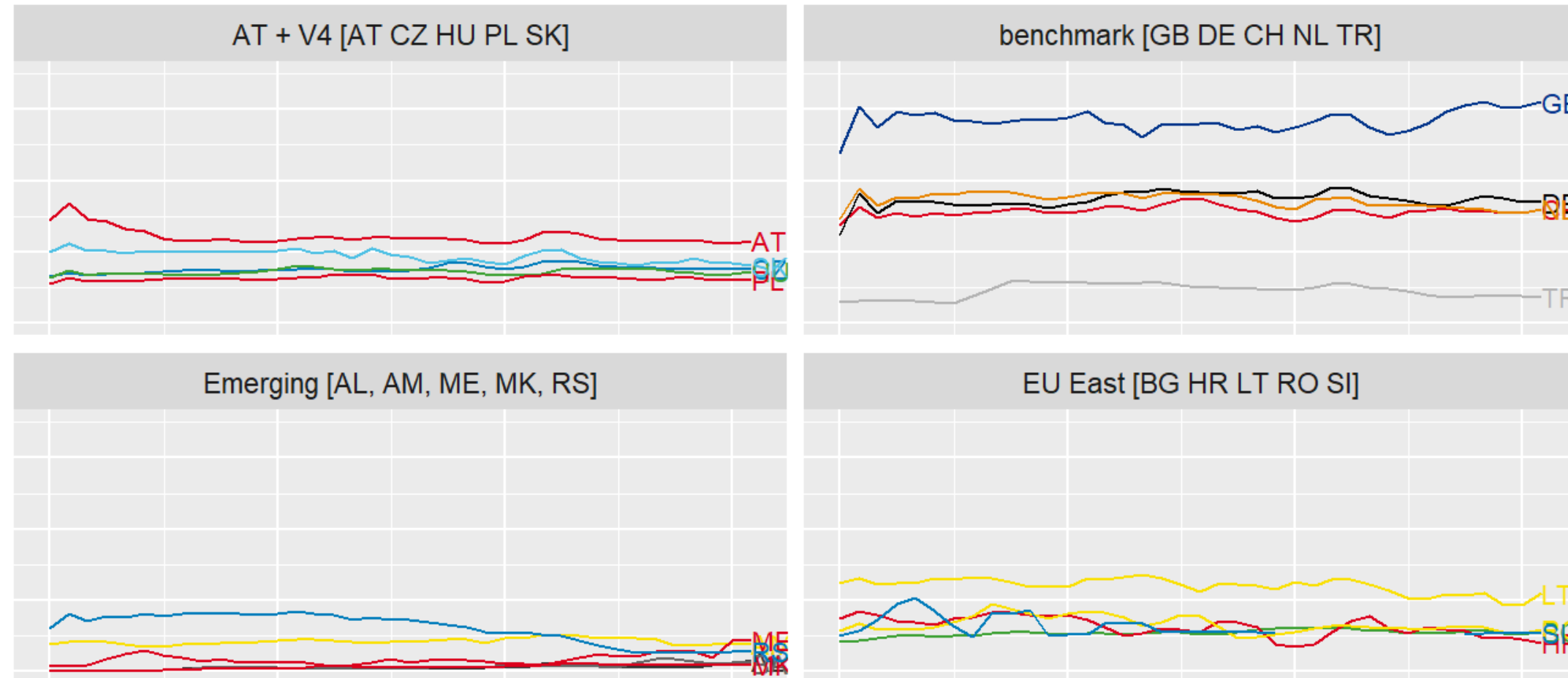
Ex Ante Survey Harmonization



- Combining *ex ante* and *ex post* survey harmonization allows to create small scale surveys, such as simpler online surveys, that are more representative, or fully representative of a population.
- This method combines new research information with pre-existing information, for example, in the European Values Survey, Eurobarometer, Afrobarometer, EU LFS, etc.

Systematic Sampling of Big Data

Total Stream Income* of Median (Typical) Song

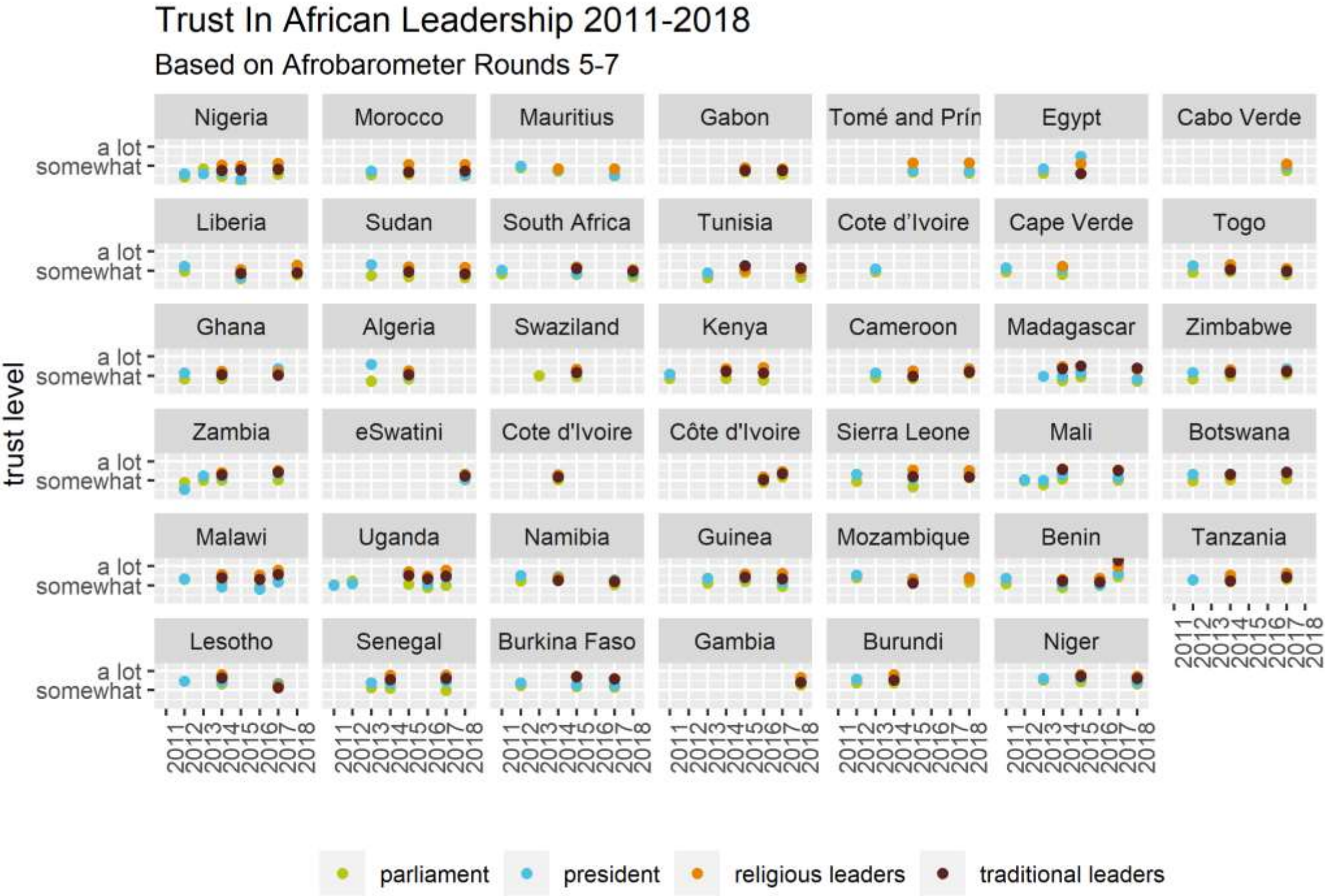


The income of a typical song in 20 countries, 2015-2019, monthly values.

*Apple Music + Deezer + Spotify, rolling monthly sums of three month
Calculated at reporting end exchange rate in GBP
Source: Central European Music Rerpot by CEEMID & state51 © 2019

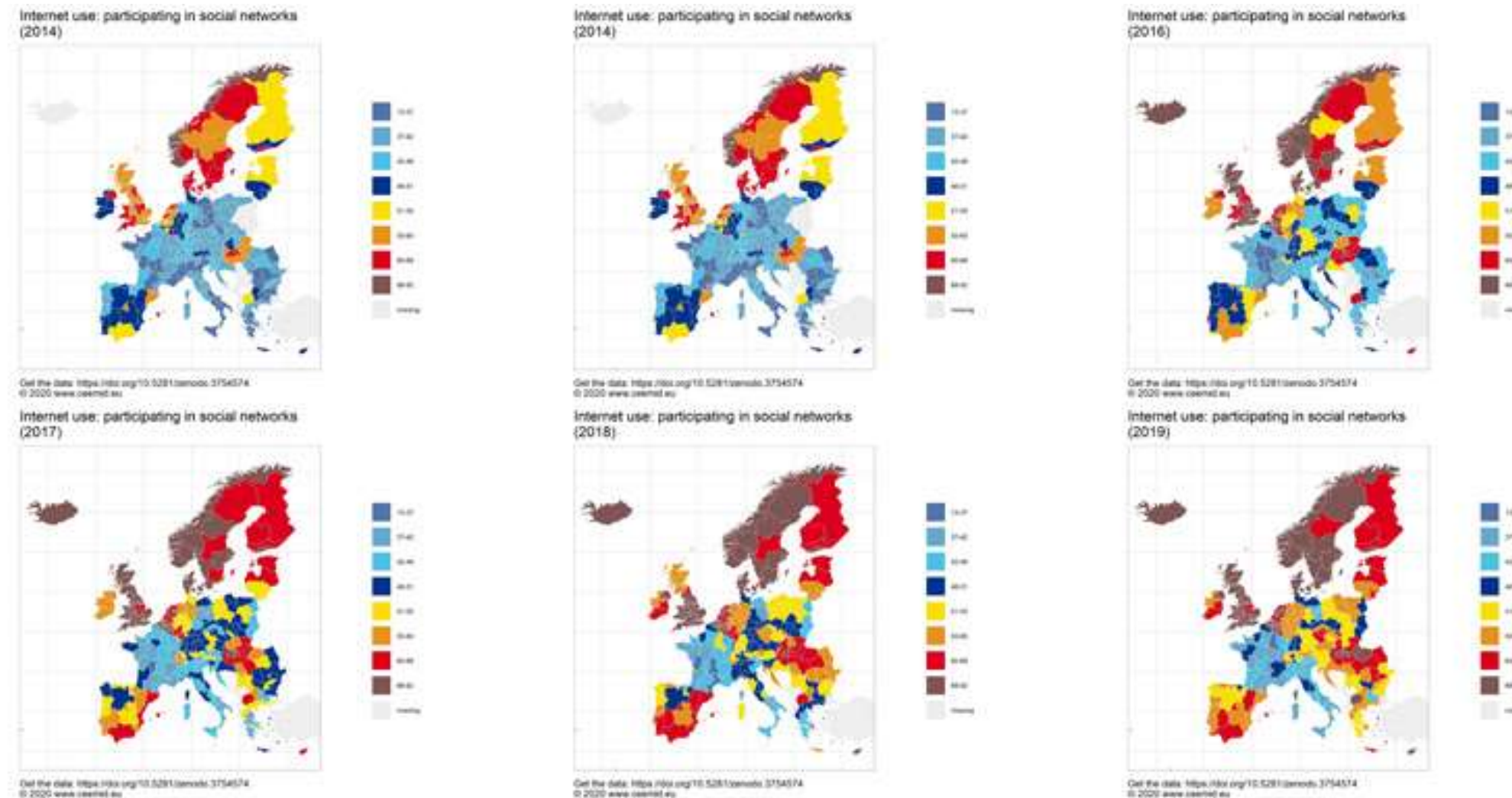
- Many researchers know how to query the Spotify or YouTube API, but how to do it in a representative and reproducible manner?

Ex Post Survey Harmonization



- Ex post survey harmonization allows the combinations of pre-existing micro-level data, either published, or available for researchers, for example in the Eurostat microdata research.
- It can combine international datasets without having to commission a new survey

New Statistical Indicators

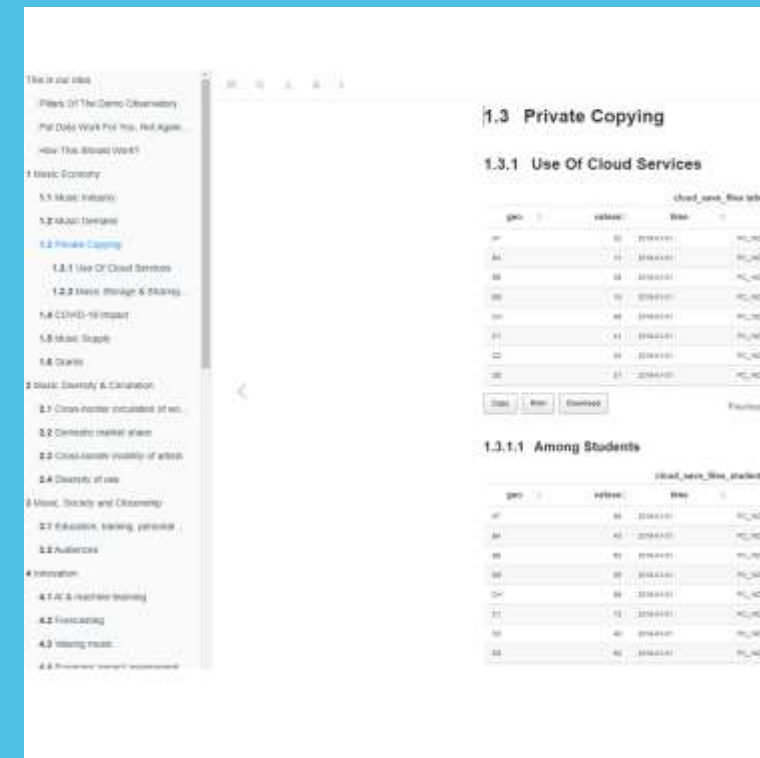


- Statistical agencies and governments collect many-many times more data than what eventually is released as statistically aggregated data products (for example, the GDP or regional GDP indicator, literacy indicators, etc.)
- Via rOpenGov and our peer-reviewed statistical softwares, we have access to the raw data of Eurostat and other governmental and scientific agencies covered by the EU Open Data Directive, or similar legislation in other jurisdictions, and using the very same methodology of Eurostat, OECD, we can create similar statistical indicators ahead of the official publication date, or in details that are not published by the statistical agency.

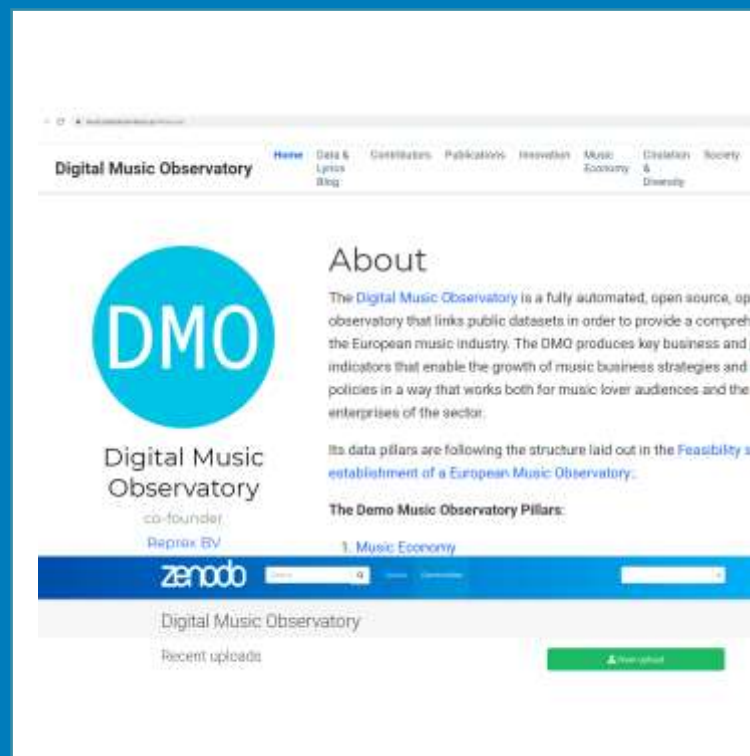
What is our service?



A modern, ODBL open API with daily refreshing indicator, processing and descriptive metadata. Download via SQL or in simple csv tables.

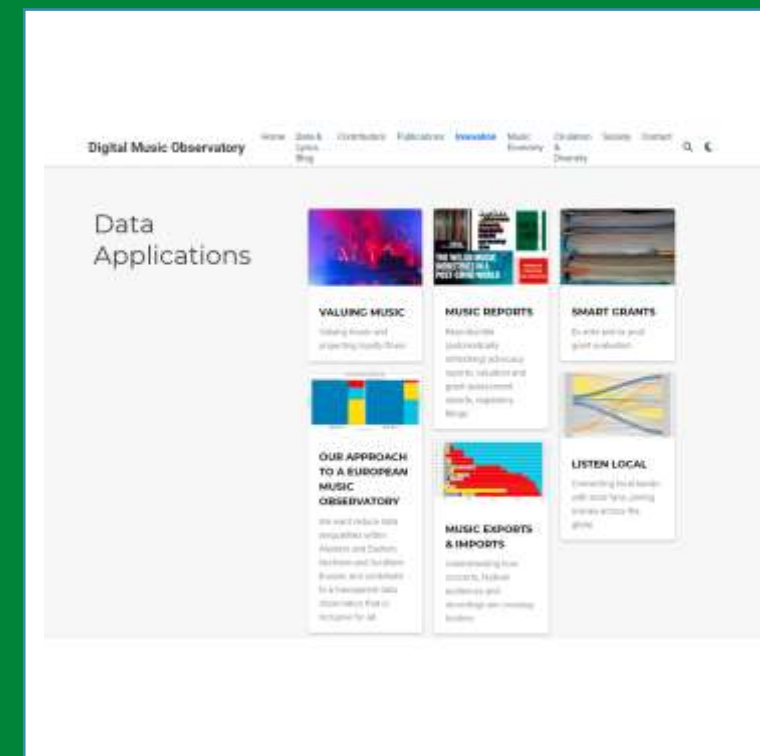


A daily refreshing long-form documentation with explanations, visualizations and human readable metadata.



A dedicated community space on Zenodo for authoritative data copies with DOI.

Website with tutorials and use cases of the data from leading experts.



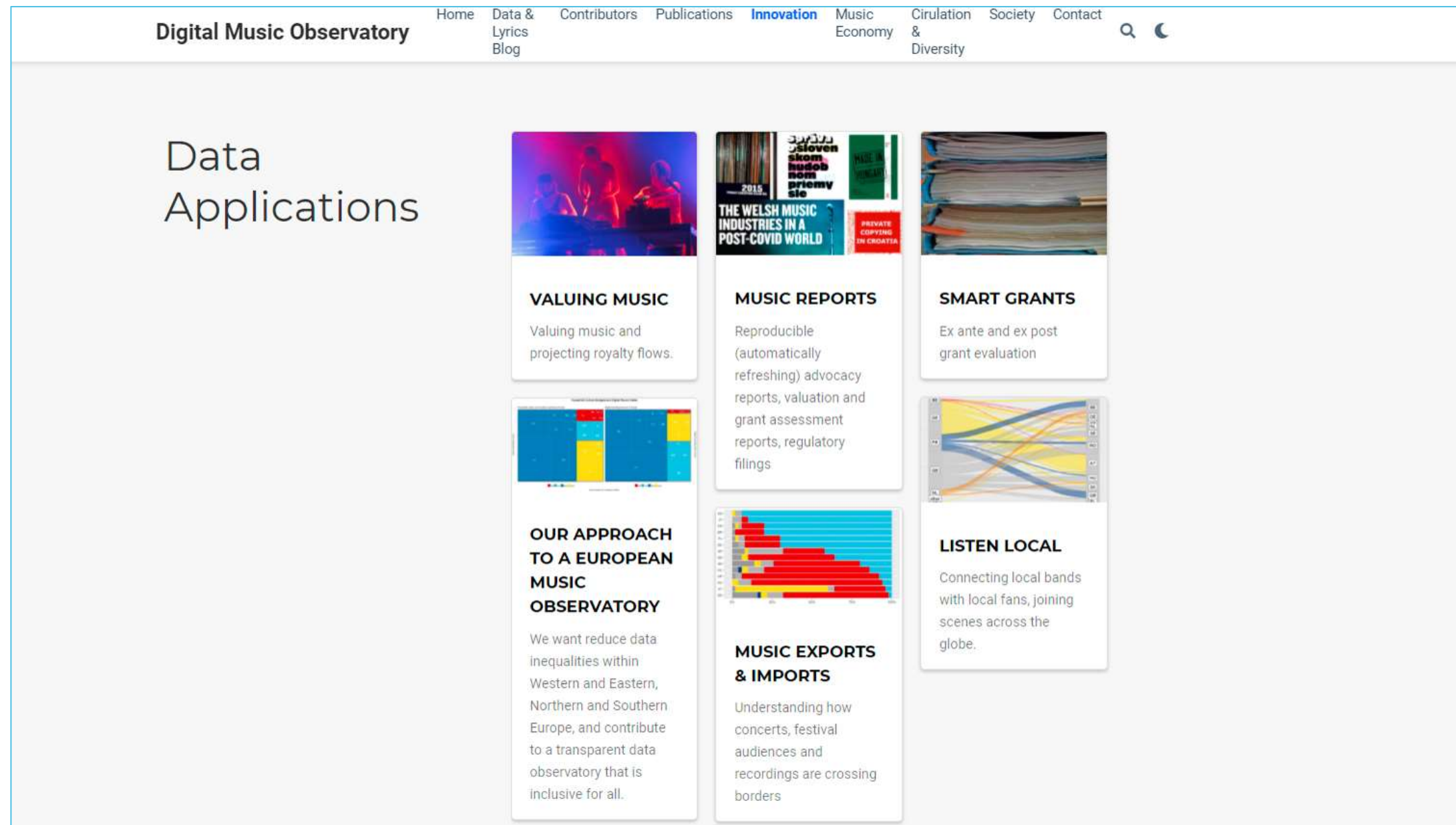
We would like to integrate our data flow with your research workflow. Our service design team is looking forward to requests from public and NGO policy users, researchers and consultants.

Uses cases

Visit music.dataobservatory.eu and look at our public policy, business and scientific use cases.

- Our observatory has a 7-years history in collecting, integrating and creating music industry indicators for all Europe.
- We have collected about 2000 indicators, and we are trying to make a case to release the proprietary datasets on a data altruism basis.
- Our open datasets (processed from open government or PSI, open science and big data sources) are available via our API.
- Our data has been used in public policy, grant evaluation, royalty price setting, competition policy and other contexts.

Contact us on music.dataobservatory.eu



Open governmental data:

We access re-usable public sector information covered by the Open Data Directive, and various freedom of information legislation.

Observatory specific text

Open scientific data:

We access re-usable scientific data from the Zenodo repository

Observatory specific text

Data sharing:

We are encouraging our users and data curators to share their proprietary data through us.

Data is getting exponentially more valuable in integration than in isolation. We incentivise data sharing with 8 years of industry experience

Big data sources, satellites:

We are monitoring various transitory but open APIs, satellite images and other continuous "big data" sources and use novel statistical technology to capture them into permanent, reliable and timely statistical, business, policy or scientific indicators.

Data sources

Data

API to our data, our sources, how we process and validate it, how we increase its quality.

API PSI, FOI and open gov Open Science Data Sharing

API

Get data from the Green Data Observatory via our API

May 16, 2021

Data Applications



VALUING MUSIC

Valuing music and



MUSIC REPORTS

Reproducible



SMART GRANTS

Ex ante and ex post

It would be difficult to name all our data sources.

- We reprocess Eurostat indicators, and correct regional statistics.
- We create indicators from various harmonized Cultural Access and Participation, Eurobarometer, and industry-specific surveys.
- We create indicators from 'big data' sources.
- We are re-releasing open science data sources.
- We are mapping non-open data and we are trying to make a case to release them on a data altruism basis.

Contributors

Contributors of open data, open-source software, maps, organization and public relations

developers



Andrés García Molina, PhD
Data Scientist & Ethnomusicologist



Botond Vitos
Data engineer



Daniel Antal
Data Scientist & Founder of the Digital Music Observatory



Kasia Kulma
Contributor, data science and software engineering



Leo Lahti
rOpenGov coordinator

data curators



Caterina Sganga
Data curator for cultural diversity and data pooling



Dominika Semaňáková
Musicologist



Eszter Kabai
Data curator for cultural diversity and data pooling



Peter Ormosi
Music Economy & Innovation data curator



Stef Koenis
Data curator for classical music

service development team



Annette Wong
Contributor, digital strategist and product marketer



Kátya Nagy
Music Research Assistant



Suzan Sidai
Contributor, Business Development

institutional partners



Our Digital Music Observatory is being developed in an open collaboration with individuals, music industry stakeholders and research institutions.

The four team members in our EU Datathon 2021 submission form were selected in no particular order.

We are actively recruiting and added new contributors every day to our website.

Contributor Covenant



[Home](#) [Adopters](#) [Latest Version](#) [Translations](#) [FAQ](#)

CONTRIBUTOR COVENANT CODE OF CONDUCT

Our Pledge

We as members, contributors, and leaders pledge to make participation in our community a harassment-free experience for everyone, regardless of age, body size, visible or invisible disability, ethnicity, sex characteristics, gender identity and expression, level of experience, education, socio-economic status, nationality, personal appearance, race, caste, color, religion, or sexual identity and orientation.

We pledge to act and interact in ways that contribute to an open, welcoming, diverse, inclusive, and healthy community.

Our Standards

Examples of behavior that contributes to a positive environment for our community include:

- Demonstrating empathy and kindness toward other people
- Being respectful of differing opinions, viewpoints, and experiences
- Giving and gracefully accepting constructive feedback
- Accepting responsibility and apologizing to those affected by our mistakes, and learning from the experience
- Focusing on what is best not just for us as individuals, but for the overall community