European Commission

European Big Data Hackathon

Looking for big-data-based solutions to EU policy questions through statistical innovation

eurostat

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Introduction

In today's digital age, data is a key asset for both the economy and society. As such, the exponential growth of so-called **'big data'** is driving technological innovations across numerous fields.

Big data refers to the very detailed data collected automatically, in large quantities. This data can either be created by people or generated by machines, such as sensors collecting climate data, satellite imagery, digital photos and videos, purchase transaction records, GPS signals, and more.

Big data represents new opportunities in the field of official statistics. It has the potential to deliver new, more detailed and timelier statistics, thereby better addressing the data needs of EU policymakers and enhancing our understanding of societies and the economy.

Unlocking the potential of big data also triggers technological innovation, e.g. cloud computing, and requires new competencies and skills across all departments of statistical offices.

To stay ahead of the curve and capitalise on new developments and accelerate statistical innovation, Eurostat established the **European Big Data Hackathon.** This biennial event, launched in 2017, brings together big data experts and statisticians to compete and collaborate in developing new ideas, viable technical solutions and data products, deploying specific big data sources to address important policy needs.

The Hackathon encourages participants to think creatively and collaboratively, pushing the boundaries of traditional statistical methods. By fostering innovation and harnessing the power of big data, Eurostat aims to continually improve the quality and relevance of European statistics.

This approach fits with the European Statistical System's (ESS) wider efforts to keep up with the rapidly changing data landscape, namely through the ESS Innovation Agenda, its flagship initiative in this area. You can learn more about this initiative in the section 'Stimulating a culture of innovation.'

Read on to find out more about the European Big Data Hackathon and how this event is helping to tackle Europe's increasing policy needs through innovations in data and statistics.

About the **European Big Data Hackathon**

The European Big Data Hackathon, organised by Eurostat every two years, gathers teams from all over Europe to compete for the best data product.

It challenges teams made up of participants from National Statistical Institutes (NSIs) and European Master in Official Statistics (EMOS) universities (universities offering specialised statistical education) across EU Member States.

These teams combine official statistics and **big data** to devise data solutions, supporting policymakers in one **pressing policy question** or addressing a statistical **challenge** faced by Europe.

The European Big Data Hackathon has **three main objectives:**

Solve statistical problems: By leveraging algorithms and exploring big datasets as potential sources for official statistics, the Hackathon engages practitioners, developers and data scientists across Europe to generate ideas and proposals.

Promote partnerships: The Hackathon aims to foster partnerships with the research community and private sector. It raises awareness about big data developments in official statistics in Europe and initiates, extends and reinforces collaboration with the private sector and universities.

Devise innovative products and tools: The Hackathon encourages the development of new products and tools, including data visualisation techniques, to stimulate the use of open data and public use files. This helps engage new audiences and users, making data more accessible and impactful.

Stimulating a **culture of innovation**

In the modern statistical world, high-quality statistics and data are essential for making informed decisions in the EU and its Member States, to better serve society and benefit the economy and the environment.

To keep up with the rapidly changing data landscape and meet the needs of businesses, organisations and society, the ESS must innovate. Innovation is not an option, but a necessity. This means extending the range of statistical sources, introducing new methods of data compilation while maintaining the highest quality standards, improving the timeliness and detail of data, and quickly introducing new statistics to the market.

In 2023, the European Statistical System Committee (ESSC) endorsed the ESS Innovation Agenda – a comprehensive innovation plan that aims to:

- expand the use of digital technologies (e.g. artificial intelligence);
- widen the use of data sources, including new digital sources;
- pursue more innovative practices;
- create conditions for successful innovation so that they can more quickly anticipate and respond to the challenges ahead.

Although the European Big Data Hackathon predates the ESS Innovation Agenda, it is a key initiative that can support the Innovation Agenda's drive to foster and promote innovation in official statistics.

- By bringing together data enthusiasts, experts and professionals from NSIs and EMOS universities across Europe, the Hackathon serves to stimulate creative thinking and innovative solutions in a practical, dynamic environment.
- The Hackathon event not only highlights the importance of leveraging novel data sources and cutting-edge methodologies and technologies, but also emphasises the creation of new statistics alongside the improvement of existing statistical outputs. Participants work with these advanced technologies, showcasing their potential to transform the field of official statistics.

Therefore, the Hackathon fits with the ESS Innovation Agenda's objective of creating an environment that encourages innovation. Such an environment allows the statistical community to experiment and learn, continuously improve, and accept risks and failures as part of the journey.

By promoting innovation and the use of novel data sources, the European Big Data Hackathon plays a wider role in shaping the future of official statistics. The Hackathon offers an intensive data dive, where new ideas are generated and assessed for their potential to address policy questions.

This efficient evaluation process quickly removes solutions that are likely to fail.

The Hackathon also fosters a strong element of collaboration, as teams work together towards a common objective, utilising the distinct expertise of team members who often come from different institutions and represent diverse profiles.

Additionally, the competitive nature of the Hackathon encourages ambition and helps choose the best solutions from various options.

How a **Hackathon works**

What is a Hackathon?

A data hackathon is a short and intense event where teams compete to creatively tackle data problems and prototype data analytics products.

Who can take part?

Hackathon teams typically consist of experts such as data scientists, computer programmers, graphic and interface designers and statisticians.

In the case of the European Big Data Hackathon, Eurostat invites NSIs and its network of European universities (EMOS) to nominate teams, bringing together some of Europe's brightest statistical minds and pitting Member States against each other in a fun but high-pressure environment.

Each team consists of three members from NSI staff, master's students, the national data science community, or collaborating partners.

EMOS teams compete for a special EMOS prize, providing them with an excellent opportunity to test their statistical knowledge from university on practical data problems.

They offer a new perspective compared to the experts working in NSIs and their engagement helps to reinforce the ESS's collaboration with academia.

How does the event unfold?

The Hackathon sees teams compete to create the best big data application to address a pressing data problem linked to a European policy or statistical issue.

At the start of the Hackathon, participants are faced with a policy-related challenge, while the datasets are indicated in advance. In some cases, only the description of the data ('data catalogue') is provided in advance with the real data made available at the start of the Hackathon.

Eurostat, in collaboration with other Commission services (e.g. the Directorate-General for Digital Services (DG DIGIT) or the Directorate-General for Defence Industry and Space (DG DEFIS)), provides access to cloud infrastructure and a space for participants to work, then leaves teams to dive into two or three days of intense work as they develop prototypes to tackle the problem posed by the policy question.

Evaluation

At the end of the Hackathon, each team presents their prototype to a panel of evaluators. After the presentations, the evaluators assess the best proposed products and select the winners and runners up.

Starting from the 2025 edition, audience prizes will be introduced in the following categories:

Best hack: Recognising the top technical solution or method;

Best idea: Celebrating the most innovative solution;

Best pitch: Recognising the best presentation.

The Hackathon concludes with an announcement of the winners and runners up, with the winners awarded in a special session of the New Techniques and Technologies for Statistics (NTTS) conference and given the opportunity to present their developments to a scientific audience.

What's in it **for participants?**

The European Big Data Hackathon offers a number of benefits. It provides participants with a platform to showcase and develop their skills, collaborate with like-minded individuals and tackle real-world challenges.

Hackathons also foster creativity and innovation, encouraging participants to think outside the box and develop cutting-edge solutions.

In particular, the European Big Data Hackathon offers the following benefits to participants:

Innovation: The Hackathon encourages creative and innovative thinking, which can benefit participants when seeking inspiration for future innovative projects in their organisations. As mentioned earlier in this booklet, this fits the approach of the ESS Innovation Agenda, which is stimulating a culture of innovation across Europe. This culture enables participants to experiment, learn and improve in a welcoming environment where innovation is encouraged.

Skill enhancement: The Hackathon allows participants to hone their data science, coding and problem-solving skills in a high-pressure, real-world environment. It also provides participants with an opportunity to work with new techniques and tools that reflect the latest state-of-the-art in statistics, while testing their skills against peers and identifying areas for improvement.

Networking: The Hackathon brings together a diverse group of professionals from across Europe's NSIs, strengthening networking between national institutions and EMOS universities. Participants meet other like-minded experts, share ideas and can build valuable connections.

Recognition: Winning teams receive recognition and prizes, including the opportunity to present their prototypes at the NTTS conference. Additionally, all teams participating in the Hackathon will have their pitching slides broadcast widely, available for all to see on the European Big Data Hackathon website.

Overall, the European Big Data Hackathon offers a rewarding collaborative experience, fostering teamwork and close collaboration with Eurostat and European Commission experts.

Highlights from **past Hackathons**

The European Big Data Hackathon is a biennial event, with four successful editions held since its inception in 2017. The fifth edition of the Hackathon is set to take place from 6-10 March 2025, culminating in the NTTS conference in Brussels on 11-13 March 2025.

Below, you can find more information on previous editions of the European Big Data Hackathon.

Highlights from **past Hackathons**

European Big Data Hackathon 2017

On 12 March 2017, Eurostat organised the first-ever European Big Data Hackathon. 22 teams from European NSIs competed to develop a data analytics tool aimed at reducing the mismatch between jobs and skills at regional level in the EU through the use of online job advertisements data.

The winners of the Hackathon were as follows:

- **1st prize:** The team from **Croatia**, who developed an EU skills and jobs explorer.
- **2nd prize**: The team from **France**, who focused on migration and mismatch of skills.
- **3rd prize:** The team from **Estonia**, who developed a megatrend and intervention impact analyser for jobs.

European Big Data Hackathon 2019

The second European Big Data Hackathon took place in Brussels from 9 to 12 March 2019, alongside the NTTS 2019 conference.

At the second European Big Data Hackathon, participants competed to develop a **data analytics tool aimed at reducing response burden** and enriching or replacing the statistical information provided by the time use survey, based on smart sensor data.

The winners of the Hackathon were as follows:

- **1st prize**: The team from **Statistics Poland**, who created an open-source prototype delivering a dashboard for the data analysis of population time use.
- **2nd prize:** The team from **ISTAT – Italy**, who created 'SMUTIS,' an integrated open-source environment for data analytics, visualisation and food classification.
- **3rd prize:** The team from the **Office for National Statistics – United Kingdom**, who developed a system to enrich data collected via traditional questionnaire-based surveys with automatic processing of photos of meals taken by respondents.

European Big Data Hackathon 2021

In 2021, during the COVID-19 pandemic, 22 teams, each consisting of three members from NSIs and universities participating in the EMOS network, participated in a fully virtual event.

This edition aimed to foster expertise in using big data sources while generating innovative ideas for products and tools in international trade networks.

Participants were tasked with analysing the effects of the COVID-19 pandemic on external trade, linking this policy-related problem to one of the most pressing challenges of the time.

The winners of the Hackathon were as follows:

- **1st prize:** The team from **ISTAT – Italy**, who created 'Cosmopolitics,' an open-source dashboard with data for macro- and micro-level economic analyses, including an interactive map and options for mobility policy analysis and a COVID-19 impact evaluation on international trade.
- **2nd prize:** The team from **Statistics Poland**, who created 'Dashboard for Forecasting and Simulating Trading Trends' (DFSTT) – a web application in an open-source model with API included, descriptive statistics, neural networks, machine learning, prediction and innovative visualisation.
- **3rd prize:** The team from **Statistics Lithuania**, who developed an interactive application called 'Divergence,' which analyses 20 years' worth of international trade data in real time to visualise trading patterns, products, means of transport, and to reveal economic vulnerabilities.

European Big Data Hackathon 2023

In 2023, 24 teams from NSIs and four teams of students from EMOS network universities competed in the 2023 European Big Data Hackathon.

Held in Brussels again as an in-person event, the 2023 Hackathon aimed to foster expertise in leveraging **financial transactions data.** The competition's dataset contained fully anonymised daily financial transactions data made available to Eurostat by the data's owner, Fable Data Limited. Participants were encouraged to produce innovative ideas for products and tools relevant to EU policies, showcasing the potential of this big data source in addressing key challenges.

During the event, the teams were challenged to design an early warning system relevant for EU policymakers. The teams approached the data challenge creatively, presenting a variety of novel ideas and solutions based on financial transactions data.

Four winning teams – the top three NSI teams and the EMOS team – were invited to present their Hackathon solutions at the 2023 NTTS conference.

The winners of the Hackathon were as follows:

- **1st prize:** The German Federal Statistical Office **Destatis Team 2**, who developed 'Subwatch,' which tracks the 'subscription economy.' By using credit card data, the team's application tracks how much people are spending on monthly subscription services. The idea is that consumer subscription data can indicate a looming economic crisis and the state of the digital economy in a detailed and timely manner.
- **2nd prize: Destatis Team 3**, who developed 'Twinning Europe' to support regional policymakers by identifying statistical twin regions. By comparing a region's performance with the performance of its 'statistical twin,' the application identifies meaningful early warning indicators and alert triggers for different policy areas, such as business performance, health and mobility.
- **3rd prize:** The team from **Statistics Iceland**, who developed 'CONSUME' (Consumer Spending and Economic Monitoring Engine). The team designed a dashboard to help policymakers, economists and other users of official statistics to monitor changes in consumer behaviour and economic trends.
- **Special EMOS prize:** EMOS students from the **University of Porto** received the award for the best EMOS network team for their application on using card transaction data for early detection in disease outbreaks.

European Big Data Hackathon 2025

The 2025 competition will focus on the integration of official statistics with **Earth Observation data**, provided by the Directorate-General for Defence Industry and Space (DG DEFIS) of the European Commission and the European Space Agency (ESA), utilising the Copernicus Data Space Ecosystem (CDSE).

Applications for the 2025 Hackathon are closed, but updates on the event and the NTTS 2025 conference will be posted on the European Big Data Hackathon 2025 website. The 2025 competition will feature 27 teams and 80 participants, including 20 NSI teams and 7 EMOS teams.

If you would like to learn more or have any questions about the European Big Data Hackathon, please contact Eurostat at ESTAT-EU-BD-HACKATHON@ec.europa.eu

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