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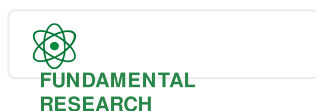


The Epistemology of Data-Intensive Science

Results in Brief

Shedding new light on role of data science, Big Data and open data in research

Thanks to modern technology, scientific research is undergoing dramatic changes. An EU initiative studied data use and management, seeking to ensure that the related research produces high-quality, reliable results and products that are relevant and beneficial to society.



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How digital technologies, communication tools and the rise of Big Data affect scientific research is crucially important to the ways in which private and public sectors organise research and innovation. Such technological innovations also influence how resources will be distributed by funding bodies and policy institutions.

Conceptualising data and its role in research

The EU-funded [DATA SCIENCE](#)  project investigated how research data are produced, processed, disseminated and reused across a variety of research situations. Examining data practices within six research realms, the team formulated a conceptual and methodological framework for the qualitative analysis of so-called

[data journeys](#)  – conditions under which data can be mobilised and reused across contexts – to expand their value as evidence for different research situations. “This methodology influenced the emergent field of data studies, and has been widely cited by scholars researching data value and use,” notes principal project investigator and [European Research Council](#)  grantee Sabina Leonelli.

The study of daily practices, concerns and needs of researchers using data in their work provided important insight into how data can travel and be made open. One area project partners explored was the role of security and ethical concerns in the strategies used to integrate data. Another was the ways in which labels, models and visualisation tools used by databases affect the interpretation of data and their use as evidence. The project team also looked at obstacles encountered in mobilising data and analysed the significance of missing, absent or inaccessible data in research. How research communities and institutions can be organised to take advantage of large data-sets and related technologies was another focal point. The DATA SCIENCE team considered the implications of their findings for contemporary debates on the reproducibility crisis and the difficulties in evaluating the quality and reliability of data posted online.

Opening up new avenues within the philosophy of science

The project is widely recognised to have contributed to a better understanding of the social and scientific implications of data-intensive methods and related digital transformations. This will lead to improved scientific governance and related policies and guidelines. “We produced an overarching understanding of how research data can be managed and reused that has informed both the philosophy, history and social studies of science, and scientific and policy decision-making concerning data infrastructures,” explains Leonelli.

DATA SCIENCE highlighted the importance of good data management for reliably interpreting data, and the key role data infrastructures play in producing excellent science. Leonelli presented these results to audiences across scholarly societies in several disciplines, national governments, the European Commission, and various agencies and international bodies involved in open science.

“Ultimately, DATA SCIENCE succeeded in producing a novel philosophy of data-intensive science that places data at the centre of scientific inquiry and explains the emergence and impact of data science and Big Data, and the consequences of these developments for contemporary research,” concludes Leonelli. “At the core of this view is a relational account of data that shows how the value of data as evidence is not context independent, but rather depends on the circumstances of its use.”

Keywords

DATA SCIENCE

data

research

scientific research

Big Data

data infrastructure

data-intensive science

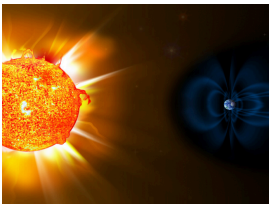
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Project Information

DATA SCIENCE

Grant agreement ID: 335925

Project closed

Start date

1 March 2014

End date

28 February 2019

Funded under

Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

Total cost

€ 1 046 000,00

EU contribution

€ 1 046 000,00

Coordinated by

THE UNIVERSITY OF EXETER

 United Kingdom

Last update: 14 July 2020

Permalink: <https://cordis.europa.eu/article/id/421505-shedding-new-light-on-role-of-data-science-big-data-and-open-data-in-research>

European Union, 2025