ICSU-CODATA Commission on Standards

AN INTER UNION MEETING – THE ROYAL SOCIETY, LONDON, 13-15 NOVEMBER 2017

SCIENCE AND THE DIGITAL REVOLUTION: DATA, STANDARDS AND INTEGRATION

Context

The explosive, exponential growth in the diversity and rate of data production, from surveys, sensors and simulations, coupled with ubiquitous communication, has created a digitally networked Earth that connects individuals, societies and their institutions, with dramatic impacts on economies, societies and politics. This digital revolution also carries profound implications for the natural and social sciences by deepening the potential for new understanding of complex systems on all scales, and in all areas of human concern, from cultural artefacts to local health systems to global sustainability. It has the potential to change fundamentally the way that science is done in the 21st century.

Seizing the opportunity: data across the disciplines

Understanding the inherently complex phenomena that are vital parts of the human condition and the planetary function require interdisciplinary collaboration. In a data-rich world, the capacity to integrate data from the spectrum of contributing disciplines to characterise and analyse this complexity depends on our responses to two vital imperatives:

- to exploit emerging online data collections to unleash the potential for game-changing discoveries across the whole spectrum of research domains;
- development of user-friendly processes that enable semantic linking and integration of datasets between disparate disciplinary areas in ways that are compatible with existing disciplinary standards.

Many communities and disciplines have seized upon the technical opportunities to create online processes and services based on data sharing that are platforms for their scientific inquiries. Some have yet to do so, sometimes because of complexities in their data. Some barriers are due to discipline specific practices, often stemming from either technical or cultural factors; some are due to traditional, but now unnecessary differences between communities. But even as knowledge communities overcome their own barriers to effective data accesses, use and sharing, the different standards that they adopt are barriers to interoperability between disciplines. There must be a major effort to achieve interoperability, both within and between disciplines. Moreover, unless these issues are addressed successfully, we will fail to realise the full potential of national and regional initiatives designed to make scientific data open, discoverable and accessible via cloud or platform technologies.

The International Council for Science (ICSU) and its Committee on Data for Science and Technology (CODATA) are promoting discussion and work to address the above two crucial issues for the scientific community, as vital components of the enabling infrastructure needed for 21st century science. A preparatory meeting was held in Paris in June 2017 involving data science and disciplinary experts. The meeting described below is intended to carry forward this initiative and to broaden it across the disciplines of the natural and social sciences.

A discussion meeting for a cross-community effort

A meeting of representatives of ICSU and ISSC international scientific unions and associations and other relevant disciplinary groups will be held **at the Royal Society, London, on 13-15 November 2017**, sponsored by ICSU. The principle output from the meeting will be a roadmap for:

- mobilizing community support and advice for discipline-based initiatives to develop online data capacities and services;
- priorities for work on interdisciplinary data integration and flagship projects;
- approaches to funding and coordination; and
- issues of international data governance.

Attendance at the meeting will be by invitation only, with support for attendees being provided by ICSU.

Outline Programme

PART 1 – Supporting and developing data capacities and sharing across the spectrum of research domains.

1. Exemplars of disciplinary provision & their scientific impacts
2. The agreements and tools necessary for effective data registration and sharing
3. Patterns of activity across the disciplines of science

PART 2 - Interdisciplinary data integration

4. Why it this an imperative?
5. The social and technical challenges of inter-disciplinary data integration and semantic linking
6. Successful stories of cross-disciplinary data-intensive research and the potential for a major flagship project(s)

PART 3 –A roadmap for scientific data, practices, support, coordination and governance

7. Coordination of efforts: union and association liaisons, data science and standards organizations liaison, and other existing efforts
8. Timescales: up-dates on the work plans of unions and, community engagement
9. Funding: funding agencies, foundations, and international consortia
10. Governance