

## The future of international long-distance research cooperation



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An expanding set of digital tools and an improving and globally accessible digital infrastructure are changing industry practices as much as our lives. Of all professions, science has been particularly quick to adopt digital means and formats in its work practices. This includes data, but also discourse, tools, and methods; even funding and infrastructure may be accessed digitally today. This digitization of science is a major driver behind the internationalisation of research and a workforce shortage of individuals with appropriate skills in digital science. Such internationalisation is not a luxury. It has become a necessity for industry. However, it is often plagued by enormous practical challenges. A recent round of panel sessions on EU-Australian research cooperation identified key trends for future internationalisation of e-Research with a focus on long-distance collaboration.

First, the motivation behind e-Research activities cannot be limited to “more data”, “more open” processes, or “data re-use”. Especially in Europe and Australasia, two key drivers for agencies to help funding e-Research are (i) to improve research quality, especially the reproducibility of research, and (ii) to enhance the use of research results beyond academia, i.e. more effective research translation. The effectiveness of these motivations is dependent on the extent to which these aims are acknowledged when the data infrastructure is first established. Simple provision of research data in a repository is not enough – thought must be given to the potential usage of the research data. Today, much effort goes into adapting existing data for a specific need, often resulting in individual and non-standard solutions. A possible way forward, for AU-EU cooperation, is the creation of virtual labs. Such labs provide not just access to data, but also tools that facilitate virtual experimentation and are characterised by clear rules, ease-of-use, data curation, etc.

Some jurisdictions and research funders have moved to supporting openness in research. For example, Europe’s new Open Science Cloud provides an opportunity to improve international engagement in initiatives that support collaborative and open innovation. However, making data findable, accessible, interoperable, and reusable (FAIR) across country borders remains a huge challenge and needs to be tackled in close cooperation across jurisdictions. The future lies in strengthened collaborations between academia, industry, and government agencies.

Unfortunately now, collaborative international funding models of significant size and reasonable simplicity are difficult to find. Although there are many initiatives and working groups, funding for cross-border and joint open e-Research schemes is scarce. Even where collaboration and open access are focused, commercial use of data may come with added administrative burdens and costs.

Human factors play an important role in the further development of e-Research. This ranges from humanities, arts, and social sciences as disciplines with specific challenges for e-Research to the human aspects in international research cooperation. Integrated platforms in the domain of humanities, arts, and social sciences provide a broad range of challenges. Research in these fields sometimes results in disparate and non-standardised large data sets that exist in such disciplines as psychology, sociology, political science, and humanities (e.g. archaeology, linguistics, history). To fully tap into the potential of open e-Research resources for innovation, much more cooperation in these fields will be needed.

Finally, these human factors also include the necessity to understand that people who collaborate around the globe need to understand the motivations, objectives and environments of their colleagues. For this, there is no substitute to meeting in person. Despite substantial progress in collaborative tools, there is little consensus today on which tools to use – from data sharing to word processing to video conferences – especially when working across sectors and continents. Therefore, and for the time being, meeting personally can and should be a key element, along with the use of digital tools, to ensure efficient international long-distance collaboration. But perhaps this is good news rather than bad.



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