Report on the Knowledge Exchange Virtual Research Environments strategic roundtable
12 May 2011, Copenhagen

Executive summary
The strategic roundtable provided an excellent opportunity to bring together key stakeholders on Virtual Research Environments (VREs). From researchers to librarians supporting Virtual Research Environments, from small scale solutions to those deploying large scale infrastructures and funders of infrastructure and research at the national, European and global level.

Virtual Research Environments are fast proving their worth within the research community. They are an increasingly valued way of managing research, making it easier to share tools and collaborate.

Virtual Research Environments are a relatively new feature of technology infrastructure. They are currently developed on a project basis. Although it is clear there are differences in the scale and scope of activities, all are faced with challenges in sustaining the VRE after project funding ceases. It is not always possible to determine whether a Virtual Research Environment itself or the research ‘assets’ within the environment need to be sustained, but consideration of potential use cases and future business models at the project outset will help.

Funding agencies need to realise the potential of Virtual Research Environments, as a new feature of digital infrastructure. Research is not limited by national boundaries and international co-ordination will prevent duplication and inefficiency within the higher education and research system.

Indications that came up for actions in the roundtable include:
- Analyse the potential impact of Virtual Research Environments as a new infrastructure requirement, to promote sustainable investment.
- Understand researcher behaviours to anticipate future requirements.
- Develop transparent policies in creation and use of Virtual Research Environments to promote interoperability and encourage aligned investment.

Introduction
The development and uptake of Virtual Research Environments is progressing steadily. However tools and applications are being developed on a project basis. Furthermore, developed materials and tools and research assets are in danger of being ‘lost’ upon completion of the research project. As the project funding ceases the VRE is no longer supported as hardware, software and staff are no longer funded to keep the VRE operational. This is a challenge which researchers and research funders must address.

As early investors in VREs, the partners of Knowledge Exchange (KE), have gained a significant amount of practical experience through the funding of projects. The roundtable sought to bring together a range of funding organisations and experts and exchange experiences and views on VREs. The focus of discussions was to extract lessons learned, improve understanding, helping identify recommendations for funding agencies.

Participants
The roundtable was attended by participants from the KE working group on Virtual Research Environments, VRE experts from the partner countries and abroad and representatives from funding agencies.

The photograph opposite shows the participants (from left to right, top to bottom): Louisa Dale (KE/JISC), Matthew Dovey (JISC), John Doove (SURFfoundation), Lars Nondal (Copenhagen Business School Library), Christian Wolff (University of Regensburg), Jim Farmer (Instructional Media+magic, inc), Uwe
Schiewgelshohn (Technische Universität Dortmund), Peter Verhaar (Leiden University), Carlos Morais-Pires (European Commission), Christopher Brown (JISC), Sigrun Eckelmann (Deutsche Forschungsgemeinschaft), Alice Dijkstra (The Netherlands Organisation for Scientific Research), Karlheinz Weber (Fachinformationszentrum Karlsruhe), Birte Christensen-Dalsgaard (The Danish Royal Library), Keith Russell (KE). Not in the photograph are Anne Sandfær (DEFF) and Lise Mikkelsen (DEFF).

Project showcase.
John Doove of SURFfoundation kicked off by presenting recent developments in the field of Virtual Research Environments. These comprise of a set of tools that help researchers to collaborate in a digital environment. VRE’s make it easier for researchers to produce, use, share and disseminate research information in a more efficient way. By even the most cautious assessment it is clear that VREs have the potential to transform the research undertaking. Despite the opportunities, afforded by these new social, organisational and technical infrastructures, they exist within the current environment and conditions.

In various studies\(^1\) and at the first KE VRE conference in June 2010\(^2\) sustainability was identified as a key challenge to VREs.

Peter Verhaar from Leiden University presented a study into a possible business model for the environments hosted at Leiden’s university library. He addressed the various aspects to be taken into account when establishing a business model (see figure 1).

Priorities for the future
Jim Farmer (Industrial Media and Magic) challenged the participants to view Virtual Research Environments from the broad perspective, considering developments from other sectors, from business from education and from technology. Participants were asked to identify aspects which they viewed as valuable in VREs and identify where funders should invest in the future. There was no clear consensus, but some priorities are apparent.

A greater understanding of the research experience and researcher behaviour is essential. The JISC and British Library study on the Researcher of tomorrow\(^3\) will give a detailed view, though limited to the UK experience. Further effort is required to demonstrate the benefits of VREs to researchers. Identifying success stories and case studies can support training early in research careers.

A ‘tool box’ approach is important, to ensure used and useful tools are sustained and to prevent duplication. Tools need to be exchanged and should be easy to connect. A starter kit can be useful to help out when starting a new VRE. International cooperation and coordinating activities will be valuable in this respect, as will the market offering provided by commercial suppliers.

Core technical requirements are interoperability, scalability and the need for user centred design. It was noted that there is not one type of VRE, but rather there is a range from small scale platforms supported by a single institution to large scale frameworks supporting work on large datasets, the ESFRI projects are an example of the latter. This also is reflected in funding, specifically developed tools may well be funded by a research funder whereas generic infrastructure is expected to be supported by the institution.

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The challenge of sustainability
In discussion led by Birte Christensen-Dalsgaard of the Danish Royal Library it was clear that responsibilities are complex, due to the global aspect of research and different types of institutional and community users. Funders must consider competence, legislation and ownership issues in policy and funding development.

VREs are recent developments, which need to fit within an existing complex research system. It is a system under considerable external pressures, as funding models shift and the business models of higher education evolve. Finding a sustainable future for VREs requires sensitivity to these external pressures and an understanding of the current challenges of global and European research infrastructures.

The research communities have a significant role to play. They need to make informed decisions, on the priorities for research infrastructures. Funders can support this decision making process by providing transparent policies.

Funder perspectives
Carlos Morais-Pires presented the perspective of the European Commission on VREs or virtual research communities as they are also called. In his presentation he mentioned the key attributes of the European infrastructure (see figure 2). The challenge for those leading the development of VREs will be to secure and sustain access on a global scale.

Sigrun Eckelmann led a discussion on the role policy and funders’ interventions can play in further developing VREs. This led to several interesting observations.

A successful VRE is a VRE which researchers are happy to use and re-use.

Data provides an opportunity to funders, who might encourage researchers to care for their research assets, by providing a budgetary incentive to store data.

As with any feature of the digital infrastructure, there are various roles and responsibilities involved in creating and maintaining VREs. A new range of competencies needs to be understood and managed, to ensure researchers have the tools and skills to make use of the technology opportunities. Aside from requiring coordination across universities and research institutes, researcher behaviours will take time to change.

Despite the challenges and complex researcher needs, there is considerable and growing experience in the creation, uptake and use of new technologies.

Conclusions
Funding agencies need to realise the potential of Virtual Research Environments, as a new feature of digital infrastructure. Research is not limited by national boundaries and international co-ordination will prevent duplication and inefficiency within the higher education and research system.

Indications for action that came up during the day included:

- Analyse the potential impact of Virtual Research Environments as a new infrastructure requirement, to promote sustainable investment.
- Understand researcher behaviours to anticipate future requirements.
- Develop transparent policies in creation and use of Virtual Research Environments to promote interoperability and encourage aligned investment.

Figure 2: Attributes of the European Research Infrastructure
Next steps
A Knowledge Exchange policy paper on Virtual Research Environments will be developed, based on the strategic roundtable. This is due for release in September 2011.
The second KE international Virtual Research Conference will take place 17 – 18 November 2011, Birmingham UK.