Analysing Open Data in Virtual Research Environments: New Collaboration Opportunities to Improve Policy Making

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ABSTRACT

This article describes how virtual research environments (VREs) offer new opportunities for researchers to analyse open data and to obtain new insights for policy making. Although various VRE-related initiatives are under development, there is a lack of insight into how VREs support collaborative open data analysis by researchers and how this might be improved, ultimately leading to input for policy making to solve societal issues. This article clarifies in which ways VREs support researchers in open data analysis. Seven cases presenting different modes of researcher support for open data analysis were investigated and compared. Four types of support were identified: 1) ‘Figure it out yourself’, 2) ‘Leading users by the hand’, 3) ‘Training to provide the basics’ and 4) ‘Learning from peers’. The author provides recommendations to improve the support of researchers’ open data analysis and to subsequently obtain new insights for policy making to solve societal challenges.

KEYWORDS

Collaboration, OGD, Open Data, Open Government Data, Use, User Support, Virtual Research Environment, VREs

INTRODUCTION

Access to data, and particularly to open data, can be beneficial for science, public policy and society, and can inform evidence-based governmental decisions (Sá & Grieco, 2016; Sivarajah et al., 2016). Open data may be obtained from governments, publicly funded research organisations and private organisations (Vercamer, Steurtewagen, Van den Poel, & Vermeulen, 2016), as well as from social media (Kalampokis, Hausenblas, & Tarabanis, 2011; Poel et al., 2015) and sensors (Poel et al., 2015). For instance, open government data (OGD) concerning the design, construction, management and maintenance of the road network can be combined with data from GPS navigation companies and with social media data from individual drivers to identify issues related to traffic congestion. The combination of these data obtained from different sources and disciplines may be used to improve traffic policy making and ultimately to decrease traffic congestion. Valuable insights are expected to be derived from novel combinations of data from different disciplines (Choi & Tausczik, 2017). Open data can be analysed by anybody, and the analysis results can be used to make informed arguments...
for embracing, rejecting or proposing new or improved policies (Janssen & Helbig, 2016). Open data can then be used for evidence-based policy analysis and evaluation (Markaki et al., 2014).

Just as new data combinations offer new opportunities (Janssen, Konopnicki, Snowdon, & Ojo, 2017), collaboration between the various actors involved in analysing open data is also expected to facilitate new opportunities to obtain new insights to solve societal problems (Susha, Janssen, & Verhulst, 2017). Collaboration is an important aspect of many open data analysis projects (Choi & Tausczik, 2017). For example, to improve policy making regarding energy sustainability, policy makers need not only data from a range of domains (e.g. energy, industry, pollution, climate, weather, housing, geography), but also the ability to interpret the data. Collaboration to combine the relevant domain knowledge of different parties (e.g. energy saving experts, pollution experts, climate experts) is needed to investigate and interpret the data and to take appropriate measures.

Virtual research environments (VREs) offer new opportunities to collaboratively analyse data and obtain new insights, especially when data from multiple disciplines are combined (Jeffery et al., 2017). Such insights may provide input for public policy making to solve societal issues (Zuiderwijk, Jeffery, Bailo, & Yin, 2016). VREs provide researchers with access to the resources, including data and software, of a multiplicity of e-research infrastructures. Although various VRE-related initiatives are under development, they suffer from user experience issues (Zuiderwijk et al., 2016). There is a lack of insight into how VREs support collaborative open data analysis by researchers and how this might be improved. The potential of VREs and open data is largely unexploited.

This paper clarifies in which ways VREs support researchers in open data analysis. It presents an analysis of VRE cases that employ a variety of support modes for open data analysis in Europe. As such, the contribution of this paper is in the form of an overview of and recommendations for user support for data analysis by researchers using VREs. The user support modes and the recommendations may be used by technical developers in the design and development of VREs, and they may be considered by policy makers of governmental and non-governmental organisations in the creation of open data policies. This paper focuses particularly on VREs that support researchers analysing open data (see Figure 1). Open data includes data from public and publicly-funded organisations (OGD), as well as research data from research organisations and data from private parties, such as data obtained from SMEs and from citizens (social media data).

Policy makers were outside the scope of this study, and the premise was that insights from open data analysis through VREs will support policy making. We focused on revealing functionalities rather than the quality of the data that is provided through the VRE. Moreover, the meeting of requirements, such as reliability and scalability, and how users learn to use VREs were also outside the scope of this study.

This article is structured as follows. First, related literature in the areas of VREs and support for OGD use is discussed. Then the approach used in this study is outlined. This is followed by a cross-case comparison of modes to support OGD use for policy making. Finally, recommendations and conclusions for VRE developers and policy makers are discussed.

**Figure 1. Open data analysis in virtual research environments**
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