



Contents lists available at ScienceDirect

Government Information Quarterly

journal homepage: www.elsevier.com/locate/govinf

Discussion

Open data platforms: Discussing alternative knowledge epistemologies

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ARTICLE INFO

Keywords:

Open data

Government as a platform

Digital

Knowledge epistemology

ABSTRACT

Although vast amounts of data have been opened by several levels of government around the world and high hopes continue to be expressed with respect to open data's potential for innovation, whether open government data (OGD) will live up to expectations is still questioned. Up to now, the OGD literature has focused mostly on the technical side of open data, with little focus on network aspects. We argue that a definition of what an OGD platform is, and what is within its scope, is lacking. In this exploratory article, we use three knowledge epistemologies – cognitivist, connectionist, and autopoietic – as a lens to examine OGD platforms and to define three different platform types. To validate and further enrich the platform types and to identify which types are most prevalent in case study research and which are underrepresented, we performed a literature review of case studies on OGD platforms published in the main e-government outlets between 2009 and 2016. Looking for elements of each OGD platform type in the case study literature resulted in a pressing question for more empirical research focusing on the network aspects of OGD platforms. We also highlighted the underrepresentation of the autopoietic OGD platform type in case study research. We conclude this article by providing a research agenda for OGD platforms.

1. Introduction

The amount and the diversity of open government data (OGD) published by all levels of government worldwide continue to increase (Howard, Blanton, Holgate, Cannon, & Tratz-Ryan, 2016). In Amsterdam, as just one example of the many smart city initiatives, open data is one of the eight project focus categories, in addition to smart mobility and smart living, among others (Fitzgerald, 2016). In the Apps for Amsterdam contest, developers are challenged to build apps that reuse OGD to improve the lives of residents and visitors. Examples at the national level include Singapore, aiming to become a smart nation (Chan, 2013), and Denmark, opening up basic data about the country and its citizens to be combined and re-used by others (Jetzek, 2016). It was predicted that open data could lead to \$3 to \$5 trillion of economic value, both directly through the development of new products and services and indirectly through innovative products leading to, for example, time savings for commuters avoiding traffic delays (Manyika et al., 2013).

In the OGD literature, much has been written on the supply side, or the technological basis of open data, whereas there has been less focus on the use of open data (Maccani, Donnellan, & Helfert, 2015) and the ways to foster re-use (van Veenstra & van den Broek, 2013). There are no clear definitions of what an OGD platform is, what is in scope, and

whether there are different platform types. We are convinced that, even though the OGD literature is still in an early stage, there is a need for a research agenda that complements the focus on data supply with platform and network aspects.

Thus, this exploratory research aims to answer the following research questions: (1) How can we define OGD platforms, and can we define different types of OGD platforms? (2) Which elements of different OGD platform types are found in the OGD case study literature?

To do this, we use three knowledge epistemologies – cognitivist, connectionist, and autopoietic – as a lens. We are convinced that this is a useful and interesting lens to look at OGD platforms, which can be considered a special form of knowledge system. By reinterpreting the knowledge epistemologies for OGD platforms, we define three platform types. To validate and further enrich the platform types, we perform a literature review that looks for elements of each type in OGD case studies published in the main e-government outlets (Scholl & Dwivedi, 2014) between 2009 and 2016. Although looking at the cases through the lens of the author brings some limitations, this review validates the applicability of the platform types to OGD case studies and indicates the focus of the OGD case studies. From this literature review, we are able to identify which platform types are most prevalent and which ones are underrepresented. Therefore, the literature review also gives rise to a research agenda.

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<http://dx.doi.org/10.1016/j.giq.2017.08.007>

Received 12 May 2017; Received in revised form 22 August 2017; Accepted 25 August 2017
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Our first contribution is the introduction of three types of OGD platforms. A second contribution is that we explore, through empirical examples from the literature review, how the platform types lead to different foci for research on OGD platforms. We find that one of the types of OGD platforms, the autopoietic platform type, is under-represented in the literature. Therefore, a third contribution is the development of a research agenda.

This paper is structured as follows. Section 2 draws lessons for OGD platforms from the platform literature. Section 3 introduces the knowledge epistemologies that will be reinterpreted to define the different OGD platform types. Section 4 explains the methodology used for the literature review. Section 5 provides descriptive statistics on the results from the literature review. Section 6 presents the data analysis and discussion. Section 7 provides a synthesis and research agenda for OGD platforms. Section 8 closes the article with conclusions and issues for further research.

2. Towards a definition of OGD platform types

2.1. OGD

Ideally, open data is available online under an open license, in a structured, non-proprietary open format, using URLs, and linked to other data (Berners-Lee, 2010). If open data is government-related data opened to the public (Kucera, Chlapek, & Necasky, 2013), it is called open government data (OGD). There are three main approaches to OGD: transparency, accountability, and innovation (Attard, Orlandi, Scerri, & Auer, 2015). We focus on the innovation approach, which concentrates on fostering re-use of open data to develop new services.

The evolution of OGD initiatives and the corresponding OGD literature have been amply documented (Attard et al., 2015; Maccani et al., 2015; Thorsby, Stowers, Wolslegel, & Tumbuan, 2017). In broad terms, the OGD literature started with defining basic concepts focused on the data but has evolved towards also taking external factors into account, opening up towards the entire OGD life cycle and including assessments and evaluations (Attard et al., 2015). However, up to now, the focus has mainly been on the supply of open data or how to make open data available (Attard et al., 2015; Maccani et al., 2015), rather than how to build something useful with it or how to foster re-use or build strategic partnerships. At the same time, van Veenstra and van den Broek (2013) stress that, especially for later phases in the process of opening up data, the ways to foster re-use and build strategic partnerships become more important.

Several authors have expressed high hopes for OGD to transform government. O'Reilly (2011) was among the first to envision government as a digital platform, where government is “a convener and enabler rather than the first mover of civic action”. O'Reilly identified the open data movement as one of the most promising forces driving this vision forward. His proposition was rooted in the belief that if the government realizes that it can be a digital platform provider, albeit a developing one, it might make radically different management choices (see, e.g., Danneels & Viaene, 2015). The enthusiasm around OGD by open data visionaries such as O'Reilly (2011) gave rise to many open data initiatives around the world, but it has been adjusted to a reality characterized by many barriers hindering the process of opening up (Huijboom & Van den Broek, 2011; Van Veenstra & Van den Broek, 2013; Zuiderwijk et al., 2012; Zuiderwijk, Janssen, Choenni, Meijer, & Alibaks, 2012). As a result, more recent visions on how OGD can transform government take an ecosystem view, taking the complex interactions between many actors into account. According to the ecosystem approach, open data re-use does not automatically follow as a logical next step from open data publication, and the re-use of open data needs to be consciously fostered. An example of the ecosystem approach can be found in Harrison, Pardo, and Cook (2012), who want to see government evolve towards “information age networked and interdependent systems”. This view is also supported by Janssen and

Estevez (2013), who refer to government as the orchestrator of a complex network of collaborative entities and see technological platforms as a key enabler. In the same vein, Brown, Fishenden, and Thompson (2014) argue for a transition to “a new, diverse ecosystem of state, private and third sector activity, organized around the citizen in the form of services.”

2.2. OGD platforms

Contrary to most of the open data literature (Thorsby et al., 2017), our definition of an OGD platform is broader than only the data portal or datasets; it also includes the actors and the (results of the) use of the data. Gawer's (2014) definition of a platform combines this focus on both technological elements and network aspects. She defined technological platforms as “evolving organizations or meta-organizations that: (1) federate and coordinate constitutive agents who can innovate and compete; (2) create value by generating and harnessing economies of scope in supply or/and in demand; and (3) entail a modular technological architecture composed of a core and a periphery”. Similarly, OGD platforms consist of a core of OGD and a periphery of APIs, apps resulting from open data re-use, and even other (linked) data, tools, and services. OGD platforms create value by generating economies of scope in innovation and lower the cost of innovating by re-using OGD. An essential part of the OGD platform for generating value is the evolving network of actors surrounding it (e.g., the third-party developers, the platform's partners and users). This network can be orchestrated by a central organization (government) or a combination of organizations. We define an OGD platform as “an architecture of data services together with the governance of access and (re-)use, created for the purpose of allowing third parties to create new value”. Government's role consists of enabling and facilitating productive value creation by leading the architecture and governance design decisions. This does not automatically imply, however, that solely government makes these decisions; it depends on the degree of openness of the design.

2.3. Platform types

Several authors have proposed unifying frameworks of platforms, defining different platform types (Gawer, 2014; Henderson, Kulatilaka, Venkatraman & Freedman, 2003). Gawer (2014) bridged information systems and economic literature in her framework distinguishing between internal platforms, supply-chain platforms and industry-platforms. The platform types distinguished in the framework require different management and governance practices and thus different research focuses as well. The identification of different platform types is based on an exogenous variable, such as the organizational form (Gawer, 2014). Henderson et al. (2003) distinguish between three platform types (an intra-firm technology platform, inter-firm capability platform and ubiquitous business platform), based on the potential scope of impact enabled by technological innovation.

Much of the OGD literature has focused on the technical side of OGD platforms, or on open data supply (Attard et al., 2015; Maccani et al., 2015), but to our knowledge, no research has been performed on defining different types of OGD platforms. OGD platforms are still a rather new phenomenon, and compared to technological platforms, there are no separate literature streams studying it. Still, we can learn from the platform literature to make a distinction between different types of OGD platforms requiring a different management and governance approach and different research focus.

To define OGD platform types, it is necessary to determine which distinguishing exogenous variable defines the difference between the types. The openness of the platform and the accessible innovative capabilities from Gawer's (2014) framework provide no exogenous variables for OGD platforms, which are by default characterized by their openness. The evolving scope of potential impact of Henderson et al. (2003) does not qualify as a distinguishing feature either, because

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