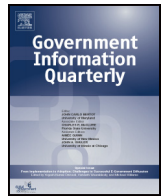




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Negotiating open source software adoption in the UK public sector

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ABSTRACT

Drawing on two case studies in the UK public sector our qualitative study explains how and why open source software has seen such a mixed response. Our narratives indicate that for both cases there was strong goodwill towards open source yet the trajectories of implementation differed widely. Drawing upon ideas of change(ing), mutability and materiality we unpack the process of adoption. The study shows that open source software has certain facets; code, community, coordination mechanisms, license and documentation. Each facet is not stable; indeed, it is changing and mutable. This creates possibilities, potential but also recalcitrance, and barriers. The interesting point of departure of our study is how open source software – a much touted transparent and open phenomenon – is by its nuanced and layered mutability able to make the process and practices surrounding it less visible. It concludes with clear policy recommendations developing from this research that could help to make open source adoption more sustainable in the public sector.

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1. Introduction

Open source software (OSS) implies openness of the source code thus making it possible to change, and improve the code (Scacchi & Alspaugh, 2012; Singh & Phelps, 2013). In effect open source encompasses certain freedoms that are embedded in the license of the code (Stallman, 1999; Stallman, 2002). Open source software and its development process have a number of key elements such as *license* (Benkler, 2002), *community* (O'Mahony & Ferraro, 2007), the *code* (Fitzgerald & Feller, 2002), *coordinating mechanisms* (Crowston & Kammerer, 1998), and *documentation* (von Krogh, Haefliger, & Spaeth, 2003). This characterization of OSS highlights how a) these characteristics together amount to a fuller understanding of what is meant by open source software, and b) that these characteristics are not fixed but instead changing, in flux and unpredictable – even within the same project. Such an understanding of open source helps to reveal how (and if even) OSS mutates within a project or over time. This mutable potential of open source urges research in this area for both theoretical and policy level implications. How, if it all, does the mutable nature of open source impact practice and the work of managers in the public sector? Taking an uninformed perspective on open source adoption in an organization where the managers believe that open source is a 'fixed' idea that is not open to interpretation, but also very stable over time could lead to naïve decision-making. Our work has implications for theorizing the elements of open source software, and clear policy recommendations for practitioners in the public sector.

Research on open source has developed considerably over the last decade (Aksulu & Wade, 2010). There is however a need for more conceptual studies of public sector adoption of open source software. In this paper we examine the process of open source software adoption by two different local councils in the UK. The overarching policy and directive stemming from central government in the UK promotes the idea of open source software use, open data, and open standards. What our study reveals is how this message can become blurred and even engineered through a subtle manipulation of open source software. Indeed, open source software, like other technologies packs and makes invisible the various political logics of policies, design, and code (Bouras et al., 2014; Cordella & Iannacci, 2010).

The main aims of this paper include a) theorizing open source software through its internal facets such as license, and code along with its external characteristics such as community, documentation and coordination mechanisms, b) to draw on these open source driven conceptual ideas to understand open source adoption (possible) manipulation in the public sector, and c) to derive policy recommendations that could make manipulation more visible. We thus unpack the adoption and procurement of open source software by two local councils in the UK sensitized by ideas of becoming (Tsoukas & Chia, 2002), mutability (Mol & Law, 1994) and materiality (Dugdale, 1999; Faraj & Azad, 2012; Leonardi & Barley, 2008). We recognize and show how the becoming (complicated, uncertain, never stable or complete) of OSS adoption indicates that the process of becoming occurs at different speeds (Colville, Brown, & Pye, 2012).

Our main theoretical contribution is an explanation of how the *speed of becoming* is managed and controlled and can be purposively directed through facets of open source (code, community, license, documentation,

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and coordinating mechanisms). Our narrative shows how management in the local councils reined in (or otherwise) the process of becoming via material instantiations of OSS. The nature of materiality was manipulated in both cases to different ends, and results. Our main policy contribution in this work is a set of clear recommendations for public sector officials and central government to make open source adoption more useful and cost-effective.

Section 2 provides background literature to this study and contextualizes our work, Section 3 details the methods adopted to collect and analyze data, Section 4 provides background on our two cases, Section 5 is the findings, the discussion and implications are in Section 6, and Section 7 refers to the limitations of this study and future research.

2. Open source in the public sector

Adoption of software and IT often does not follow a well-laid out plan and every context is quite different. Context, as argued by Robey and Sahay (1996), plays a very important role as technologies are adopted and used in situ and thus need to be studied as such. This not only forces us to take note of specific differences in each case but makes generalizability difficult. Most of the studies of software adoption in the public sector are evidence that a certain amount of drift is usual (Ciborra, 2000) and perhaps even necessary as the adoption process grows in acceptance at the individual and collective levels (Feilner, 2013). There are a number of detailed studies that take a cultural perspective on software adoption (Barrett, 1999; Cabrera, Cabrera, & Barajas, 2001; Jackson, 2011). A significant and deeply engaging study of ICT use in the public sector by Bovens and Zouridis (2002) examined the role played by law, and how this role was unconsciously being taken over by software developers. The premise of their argument was that code was beginning to play the role of law as most infrastructure was software intensive, and it dictated what was allowed or not. Near the end of this paper the authors also touch upon the idea of transparency through code and algorithms but leave us with the tantalizing question of, “Which interpretation of the rules is exactly concealed in the algorithm?” (Bovens & Zouridis, 2002) (p183). We begin to answer this question in this study.

However, most IT adoption studies usually focus on workarounds as a manner of performative adoption (Feldman, 2000; Gasser, 1986; Monteiro, Jarulaitis, & Hepsø, 2012; Orlikowski, 1996). Such work has always kept users as central. This paper is not an adoption study in the conventional sense of user adoption. The aim of this paper is to understand higher level procurement decisions where decisions are made by strategists, top IT managers and policy writers so users, unlike for Boudreau and Robey (2005), are not our *only* focus. Instead, we look to literature on procurement of open source and primary adoption of open source software (by IT staff and developers), and secondary adoption by users (Fitzgerald, Kesan, Russo, Shaikh, & Succi, 2011).

Open source adoption in the public sector has seen some growing interest in IS journals (Cassell, 2008; Hamel & Schweik, 2009; Maldonado, 2010; van Loon & Toshkov, 2015). There are also a number of interesting conference papers that are beginning to shape our understanding in this space (Allen, 2010; Davini, Faggioni, Granatella, Tartari, & Scotto, 2005; Jokonya, 2015; Shaikh & Cornford, 2011b, 2012; Souza, & Zwicker, 2001; Zuliani & Succi, 2004a, 2004b). Some work on the commercial adoption of open source software speaks strongly to a practitioner audience. This is essential and much needed, but we find it equally relevant to build a body of theoretical work that helps to explain open source adoption (or not).

An example of a practitioner and managerial perspective can be found in a study based in Australia (Goode, 2005). This work draws our attention to some of the key challenges faced by companies when choosing between open source software and proprietary products. Goode (2005) argues that in many cases managers decide against open source on the basis that if it is cheap or free of charge then it can't be very good software. There is indeed such a bias where what

has little monetary value is seen to then equally have no other value or use (Fitzgerald, 2011). Amongst the other reasons for managers deciding not to adopt open source software for their company needs included a possible lack of software support (delivered in a professional and efficient manner), a steep learning curve to the use of this software, staff unfamiliarity with the software, Microsoft seen as the easier interface by comparison, reliance on old and legacy systems that were unable to interface smoothly with open source software, and even an inability to see any relevance of open source software for their company needs. And though these issues are cited by companies and managers in commercial organizations they are equally true of the public sector (Rossi, Russo, & Succi, 2012).

2.1. Broader reasons for public sector interest in open source

Procurement (Phipps, 2011) and acquisition decisions by many governments are currently under question, and greater scrutiny has led to governments in the European Union, UK, Australia (Archer, 2010) and the USA (Kundra, Gordon, & Espinel, 2011) to amend their habits. Research to date in the area of open source use and adoption in the public sector, though growing, is still quite patchy. A UK based study (Waring & Maddocks, 2005) focused on eight different local councils and agencies. This work outlined a number of concerns and key areas that need improving in the public sector before successful adoption can emerge. This was however, a high level study where details of each case and the various struggles were not the focus.

Likewise in the US, studies have shown open source use adoption needs top level support and encouragement for success (Oram, 2011). This was equally true of the study carried out in Cuba where the authors recommended that if governments are to traverse the gap between policy and implementation of open source software then top level political backing is a necessity (Garcia-Perez, Mitra, & Somoza-Moreno, 2006). Brazil is a different but another very interesting case where the success of open source adoption has been explained and emphasized as a product of insurgent experts (Shaw, 2011) who had political strength (Cassell, 2008; Nasi, Frosini, & Cristofoli, 2011; van Loon & Toshkov, 2015) as the ‘insurgents’ were part of the elite intelligentsia of Brazil and thus in a better position to exact change.

The European Commission has an explicit directive to promote software alternatives (Ghosh, Glott, Schmitz, & Boujraf, 2010), especially open source software. The European Commission has established a collaborative platform called Joinup¹ where numerous interesting and reflective cases of open source adoption across Europe are accessible. These have been written by authors from academia, public sector officials, think tank researchers and consultants. Some cases that stand out in their specific interest to the current study and for their novelty include the Extremadura case in Spain (O'Sullivan, 2013), the French Gendarmerie (Bierhals, 2009), and Camden Council in the UK (Ballard, 2013; Mangham, 2005; Offerman, 2012). And very recently, the UK Government's Cabinet Office (Ballard, 2011; Hall, 2011; Saran, 2010) met with the large and influential system integrators to declare a greater need to have open source choice offered to the government. The argument put forward by the Cabinet Office was that the government was unable to choose open source as an alternative if this was not offered as an option by the integrators. Open source software, along with open data and open standards is fast becoming part of the language that governments all over the world are eager to adopt (Burkhardt, 2008). It is, for example, one of the basic building blocks of the US government in relation to its encouragement of its open government initiative (Noveck, 2011).

The USA has seen real progress with respect to ‘open’ – with the two-time election of Obama we can note the strong backing for open government (Harrison & Sayogo, 2014; Noveck, 2011; O'Reilly, 2010;

¹ <https://joinup.ec.europa.eu/>.

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