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DRAFT PAPER prepared for the 1st Berlin Symposium  
on Internet and Society  
October 26th – 28th 2011

## **Participation and Power: Intermediaries of Open Data**

Conference Draft

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Paper prepared for the 1st Berlin Symposium on Internet and Society,  
Oct. 25-27, 2011

# Participation and Power: Intermediaries of Open Data

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***Abstract:** With governments and public bodies around the world embracing “open data” as a tool for increasing citizen empowerment and participation, this paper examines the information flows within the open data development community and aims to help us understand the dynamic of these information flows. It does so by positioning open data within a wider epistemological and theoretical context and testing some of these theoretical hypotheses against empirical data from the world of open data flows. The open data community is*

*shown to be fragmented and disparate, with far less participation and combination of data sources than originally hoped. Instead of a wide open playing field devoid of hierarchies we find developers and datasets alike become crucial linking points – crucial gateways for the flow of information – between sub-communities of open data development based on specific tasks or contexts. Moreover, where castes of lobbyists came to dominate e-rulemaking, and cliques of citizen journalists came to form echo-chambers in the blogosphere, so too do open data developers act as unelected representatives for the wider citizenry. It is they who find, assimilate and visualize the data for wider consumption. It is through them, through these disconnected and task-focused communities, that information flows. This raises new questions over how their power can be utilized for the public good rather than individual gain.*

## Introduction

A new concept has been making its rounds recently in the circles of digerati, Internet activists and public sector reformers alike. Termed “open data”, its aim is to make available online vast datasets collected and managed mostly by the public sector, for everyone to see, download, and analyze. The hope is to create a new level of public transparency, empowering citizens, informing public debate, reinvigorating democracy, and improving public sector efficiency (Shadbolt, 2011; Orszag, 2009; Noveck 2009).

For example, in the US upon coming to power the Obama administration created an Internet portal – data.gov – as a central repository and one-stop-shop for public sector datasets. The site also offers free tools for citizens to process and visualize the data, and showcases examples of web applications that utilize these newly available datasets. With Recovery.gov and USAspending.gov, two visually appealing, interactive websites were created to demonstrate how powerful such datasets become when, in this case, they are linked to geographic locations and mapped.

In the UK the government has undertaken a similar initiative. Loosely modeled after its US counterpart, the data.gov.uk website acts as a central repository for public sector datasets, for advice and guidance on how to use them, and for showcases of open data success stories. Another website, police.co.uk, launched with much fanfare (even crashing servers under unexpectedly heavy initial traffic) and aims to highlight the power of open data by visualizing crime reports down to the neighborhood and street level for all of England and Wales.

Open data has also been embraced by individual cities and municipalities – not only in the US and UK, but also in many continental European nations including Germany and Austria.

On a supranational level, international organizations like the World Bank and the OECD, which had long guarded and even commercialized the data they collected, have now made many of their datasets freely available online, as part of similar open data initiatives.

As huge public sector datasets become available online around the world, will we witness a democratic renaissance and an enlivened informed public discourse? And if so, who will act as agents of change – the citizenry? Or will we see the rise of a new caste of intermediaries that hold the key to making sense of the seas of data now accessible, and thus in turn develop into information power brokers themselves. Even more generally, how do the streams of open data flow, and through which nodes and why?

More generally, what theoretical frameworks exist to understand the open data dynamic? Can we learn from other types of information flows that have been “opened”, and if so does empirical data confirm our expectations based on theory? This paper aims to contribute to this nascent debate by positioning open data within a wider epistemological and theoretical context and testing some of these theoretical hypotheses against empirical data from the world of open data flows.

## I. Theoretical Context & Hypotheses

At its core, “open data” is the rerouting of information flows. Rather than giving access to public sector datasets only to a limited caste of government officials, data now can flow freely to anybody requesting it online. Because access is standardized and automatized, it requires no identification or other credentials and is thus in essence anonymous.<sup>1</sup>

Nye and Keohane have detailed that informational power is derived from controlling access to information. (Keohane/Nye 1998; see also Nye/Owens 1996) Any rerouting of information flows will change who has access to the information, and thus shift informational power. (Mayer-Schönberger/Brodnig 2001) Proponents of open data hope that such shifts readjust the power balance between government and the citizenry and thus both strengthen democracy and improve government through enhanced public oversight.<sup>2</sup> (Coleman / Shane 2011; Shane 2004)

Open data, however, is not the first attempt to reroute information flows to improve governing in recent years. In the following section we look at three examples of information flows being redirected, facilitated by the Internet: e-rulemaking, open source software, and the blogosphere.

### *a. Open Data’s public sector progenitor – E-Rulemaking*

In the US, the second Clinton/Gore administration aimed at bringing certain parts of agency rulemaking online. Agency rulemaking is a process by which federal agencies – like the Environmental Protection Agency (EPA) or the Federal

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<sup>1</sup> To be sure, such anonymization was not complete, as IP addresses and query contexts were often preserved.

<sup>2</sup> This is often based on Barber’s concept of strong democracy (Barber 1984).

Communications Commission (FCC) – draft and enact relatively technical rules by actively eliciting feedback from the citizenry. Rules are first proposed as drafts by the agency and published, giving citizens a limited period of time to comment on the drafts. Agencies are mandated to take citizen comments into account before enacting the final rule.

While in principle allowing anyone to comment, the technical nature of most rules, the need to be on location in Washington to have access to the draft rule proposed by the agency, and the relatively stringent procedural requirements for commenting on rules, actually meant that only parties deeply affected by a particular rule, and with sufficient funds to have a (lobbying) presence in Washington, took part in the process and submitted comments.

The Clinton/Gore administration hoped that moving this rulemaking process online would broaden participation. Some commentators prognosticated a revolution in citizen empowerment (Brandon / Carlitz 2002; Noveck 2004), and early participation numbers were encouraging (Shulman 2003; de Figuereido 2006). However, a closer analysis of e-rulemaking before the FCC and the EPA revealed a much more sanguine picture. Very few proposed rules attracted more than a couple of hundred comments each. A few resulted in tens, even hundreds of thousands of comments, but the overwhelming majority of these comments were boilerplates, organized and orchestrated by lobbyists for interested parties to offer a mirage of citizen concern. The hoped-for comprehensive and sustained empowerment of the ordinary citizen to take part in designing the law of the land was nowhere to be seen. In this sense, e-rulemaking was a failure. (Coglianese 2005)

That said, some comments are better than no comments. E-rulemaking *had* resulted in increased participation, albeit not by orders of magnitude. These additional comments were coming from interested parties – especially local and regional NGOs and citizen groups – without a presence in Washington. With sufficient substantive knowledge, it was largely the necessity of being present in Washington that had precluded them from actively taking part in the traditional rulemaking process. Once e-rulemaking eliminated this barrier, these groups did in fact become engaged (Coglianese 2007).

While this did not lead to an appreciably better informed citizenry overall, both federal agencies and affected parties found the outcome of the e-rulemaking process – the enacted rules edited with the additional comments factored in - to be of remarkably higher quality than before (Coglianese 2007).

E-rulemaking has resulted in information flows being redirected. Traditional information intermediaries, like the lobbyists in Washington have suffered a relative decline in their power as new intermediaries – more often local and regional organizations – gained access to rulemaking information and took part in the commenting process.

### ***(b) Open Data's Science Root – and the link to Open Source***

Using the Internet and software tools to facilitate information collaboration beyond a limited set of (geographically close) participants to generate new insights and ideas has a long history beyond the classic public sector. On one hand we can find antecedents in open data initiatives for collaborative science research (CGED 1995). European Union research funds facilitated the creation of geographically dispersed research consortia, which utilized the Internet to work

together. Experimental physicists and astrophysicists, especially, were facing huge data sets and the related need to distribute to a large group of often geographically dispersed collaborators since the early 1990s. It is in this context that Tim Berners-Lee came up with the idea of the WorldWideWeb, easily linking files with each other and thus making them more easily accessible online (Berners-Lee, 2000). Data volumes have risen even more sharply over the last decade, causing an even stronger pressure to develop tools that enable large sets of collaborators to share and analyze data, quickly and efficiently, in a global network.

In software design, this concept of openness as redirected information flows has not only become well established, but led to what some have termed a new form of collaborative, peer-based model of production. (Benkler 2006) Loosely termed “open software” – to contrast it from software designed commercially by corporate entities – this concept is based both on the Internet as a global, open network and on a set of software tools that enable people to collaborate on joint software coding projects in an orderly fashion (Raymond 1999). In particular, this enabled work on two types of software that the commercial marketplace failed to provide. One is highly specialized niche software for which there exists not enough of a demand to create sufficient market choices. Here, the Internet and open source collaboration tools help organize and bring together the small number of people around the world wishing to address this particular need (Weber, 2004). The second are very large and complex software projects that are too costly even for moderately large commercial entities to undertake and maintain, especially when the willingness of consumers to pay for the use of such

software is unclear (Raymond, 1999). The development of the Firefox browser is a good example.

Some idealists hoped that the open source movement might lead to a democratization of software development, so that many more citizens would become active in creating the tools with which we communicate and access and process information. This has not happened. Careful analyses of a number of open source development projects have shown that the number of participating coders is relatively small (Deek & McHugh, 2008; Feller et al, 2005) – although the number of bug reporters and testers is larger. Rather than a democratization of coding, peer-produced “open source” code has led to improved software mainly through the concerted (and non-commercial) efforts of quite a finite set of coders. In addition, open source has led to the rise of new intermediaries that provide essential or useful services to the peer-producing community, like source code hosting, online forums, or online knowledge repositories for how to code well.

As with e-rulemaking, output is improved through the redirection of information and the resulting shift in control over access. But rather than developing into a mass movement, the process involves a limited number of well motivated participants, who together with new information intermediaries turn into new central nodes of information flow in the open source context.

### ***(c) Open Data’s Public Discourse Equivalent – the Blogosphere***

Participating in e-rulemaking or open source development generally requires specialized technical skills – not so much because of the process of participation, but because of the subject matter itself. Unsurprisingly, the collaborative tools

developed for highly technical domains came to be used for general-purpose information sharing as well. The underlying idea was to “open up” journalism.

The Internet has always permitted any participant to be a sender as well as recipient of information. However, creating websites was not trivial, and especially before the age of ubiquitous Internet search engines and easy cross-linking, an individual’s website would likely remain unnoticed. Easy-to-use web-based self-publishing tools with user friendly archiving, cross-linking and commenting features, together with full-text specialized search by Google and similar search engines, have provided individuals with all the elements of a digital printing press.

Some have hailed these “bloggers” or citizen journalists as the Davids that bring down the Goliath of the sclerotic, complacent traditional print and broadcast media, who publish only that which fits their ideology and who fail to investigate and question the information they are being fed by power holders. (Reynolds 2006). Blogs, it was argued, would bring ideological, cultural and socio-economic diversity to the public sphere, and spur a mass movement of ordinary citizens who abandon their role of docile recipients, and become active again in civic discourse (*ibid*). In a number of cases, bloggers were in fact able to point out glaring mistakes or omissions by the traditional media, fueling idealistic hopes.

Careful research has shown that the idealistic hopes have not been borne out. As Hindman (2007) has shown the blogosphere is highly concentrated, following a power law distribution, with a very small number of blogs accounting for well over 90 percent of the sector’s total traffic. Moreover, these leading bloggers are no more diverse than the traditional journalist caste they are aiming to replace

(Hindman 2007; Hindman 2009). The extensive cross-linking in blog posts and comments, as Sunstein has cautioned, can even lead to the creation of echo chambers in which alternative views may be even less often reported than in traditional print media (Sunstein 2006; Sunstein 2007).

Blogs have broken down the media monopoly, and redirected information flows. But rather than democratizing the public sphere through citizen journalism, the relatively few successful bloggers have become a new group of influential information intermediaries who shape public discourse and public opinion, much like the traditional media. And demographically they have failed to introduce substantially more diversity. At best the blogosphere has improved not the process, but only the outcome of public debates by adding another voice to the mix.

Analysis of e-rulemaking, open source, and the blogosphere as examples of an openness-driven redirection of information flows all highlighted the failure to induce mass participation coupled with the rise of powerful new intermediaries. If open public data is redirecting information flows in a comparable fashion, and similar dynamics are at play, we might see a similar narrative emerge. In the following section, we test these hypotheses using an early dataset we collected, as well as qualitative interviews we conducted with emergent open data players.

## II. Empirical Analysis

Given the lack of empirical study into the actors and flows involved in open data, we felt it important to perform some foundational research into how open data is used, and who shapes the information along its journey from source to citizen. Content analysis of a cluster sample of open data web apps<sup>3</sup>, and in-depth interviews with key players along the open data chain, helped establish a qualitative indication of both how open data is used today and, ultimately, whether powerful intermediaries have come to dominate this field as they did the blogosphere and e-government before it.

Thus, a sample of web apps was constructed from four sources, including the UK government data portal *data.gov.uk/apps*, a 'gallery' of entries to the World Bank's *Apps For Development* competition, and, as an example of local data use, the Warwickshire County Council open data site. Although a representative sample remained elusive, this cluster sample served to increase the variety of apps discovered. Non-functioning apps, those which required payment or registration to view, and those without author or data source attributions were skipped, resulting in a sample size of 175 web apps.

Interviewees, meanwhile, were also chosen to increase the range of possible responses. They included former White House CTO, and now advisor to the UK Government on technology and participation, Beth Noveck, open government data supporters Chris Taggart and Richard Taylor, and open data developers Francis Irving, Matthew Somerville and Rupert Redington. Their contributions

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<sup>3</sup> Throughout, we refer to 'web apps' or simply 'apps' as opposed to static websites, which simply present information extracted from data sources. The goal is participation, interaction, deliberation – things to which engaging, single-purpose apps are best suited.

were combined with patterns emerging from the web app content analysis to provide a more holistic view of the motivations and realities of open data participation.

*(a) Who is using open data, and why?*

Much as with Open Source software, businesses, charities and even state departments have become involved in open data development. The typical open data ‘developer’, then, could just as easily be a studio of programmers and designers, as much as it could be one lone individual.

Thus we felt it important to categorize developers in our sample by size. Out of a total of 215 ‘developers’, 157 were true individuals, 30 were small groups or businesses, 23 were larger bodies such as city councils and charities, and 5 were international institutions such as Google, the New York Times and the World Bank. In effect, of those responsible for the apps in our sample, almost three quarters were lone developers.

That is not to say, however, that our sample lacked evidence of collaboration. Indeed, a number of these developers—be they individuals, groups or businesses—came together to work on the same web app. 20% of the sampled apps had two such developers and 9% had three or more developers. Still, the majority of apps (71% of the sample) had only one creator, and of those particular creators, 65% were lone individuals. Put more plainly, of those involved with open data development, only half actually form any type of working community; the rest reside in a large but disconnected fringe. Network analysis of the relationships between developers and data sources confirmed that this is the case (see Fig 1).



Our interviewees found it difficult to explain their views of 'community' in open data development. Francis Irving, previously an open source software developer, admitted the open data sphere lacked a similar common 'enemy' against which to rally, perhaps explaining the lack of community. Rupert Redington explained that, in his experience, a "loose alliance" of bloggers, politicians and charities has indeed formed around open data, but much development remains a form of "21st Century pamphleteering" with individual developers all following their own distinct agendas. Chris Taggart agreed that open data retains a tendency towards individual development, with "people going off and solving their own problems, rather than coming together from disparate groups."

Richard Taylor, on the other hand, was more positive, arguing that his area of government data, at least, is "inherently collaborative" and that "everybody knows each other", helped in part by physical and virtual meeting places such as hack days, conferences and Twitter hashtags. Matthew Somerville perhaps put it most clearly when he stated that "there are lots of communities around things *of* open data, but not around open data *itself*." Participation, then, comes down to motivation. As Matthew continued, "Nobody gets on their computer one day and goes: I need some data. You want to *do* something." The data is simply a means to an end, and that end—it appears—is very different for each community in the Open Data sphere.

Our sample alone exhibited no fewer than 18 categories of data use—from the more typical government, economic and development goals, to less common aims of using open data for environmental, educational and even corporate ends. Web apps sampled from the *Apps for Development* gallery showed an unsurprisingly strong bias towards global development indicators (and also, coincidentally, a

significantly higher proportion of apps utilizing only one data source). Excluding these World Bank apps revealed a more pronounced trend towards government and mapping data, on local and national (rather than global) scales, in the remaining web apps. It seems that, while open data competitions such as the World Bank's *Apps for Development* contest induce far higher levels of participation than a dataset might normally attract, the actual quality of participation is noticeably lower – data is used unimaginatively and is rarely combined with other sources. 'Organic' apps, on the other hand, arise out of stronger individual motivations, often on a local, tangible scale, and realized through collaboration and combination with other data sources and, indeed, other developers. These motivations can again be seen in the network diagram of relationships in our sample: although the network is sparse, distinct clusters can be observed around development/economy data, government data and mapping data in particular.

***(b) Have dominant intermediaries emerged?***

More importantly, however, the network diagram also reveals the actors with power over the data flows within our sample. The network's sparseness and the sample's bias towards the World Bank's Millennium Development Goals dataset reduce the utility of traditional network statistics like degree and betweenness. If we instead look at the data qualitatively, and with an understanding of how intermediaries or gatekeepers have functioned in other media, we begin to see *where* intermediaries are likely to form in our sample: between communities. If open data is about the rerouting of information flows, then those select few sources or developers who bridge the gaps between different segments of the open data community will surely hold the most power over where the routes those information flows take. From a perspective of information flow and social

network analysis, such a result is hardly surprising. As Burt has shown for social networks in general, power and influence often rests with intermediaries that link distinct networks and communities (Burt 2005).

Thanks to his involvement in both mapping and government data, Matthew Somerville holds a powerful position between two distinct open data communities. Likewise, the Transport for London API, a new but highly versatile data source, has sparked interest from not only transport-inclined developers, but also those from government and mapping backgrounds. Lastly, OpenStreetMap, as a source of open mapping data, is uniquely sited between US and UK government data communities – and although its use pales in comparison to its commercial competitors (eg: Google Maps, Bing Maps), it has nonetheless become a de-facto standard for developers looking to include open-source mapping functionality in their apps.

There is, unsurprisingly, distrust amongst open data developers of private companies owning large swathes of the data landscape. Ordnance Survey, the British mapping agency, was a sticking point for a number of our interviewees: Rupert Redington joked about "the tyranny of Ordnance Survey" while Matthew Somerville admitted his fear that "they are the owner of postcodes now." Francis Irving made a more fundamental objection to Ordnance Survey's past ownership of electoral boundary data – data which he believes, by its very nature, should be owned and shared democratically.

That is not to say intermediaries are exclusively bad for participation and innovation. Richard Taylor, for example, pointed out MySociety's MapIt service as a valuable intermediary upon which many third-party sites and apps have been

built. Matthew Somerville, meanwhile, discussed how sites such as MusicBrainz and the IMDB could leverage their influential position as curators and collectors of music and film data to provide valuable hooks for third-party development. From our sample alone, it was clear that Google Maps' simple and versatile API made it a popular service, utilized in just under a sixth of all sampled apps. What remains unclear, however, is where developers draw the line between intermediaries seen to be improving the open data landscape, and those seen to be harming it.

### **III. Conclusions**

If the distinction between positive and negative intermediaries in open data development is unclear, proof of their very existence is little better. Where years of hindsight make the intermediaries shaping information flows in e-rulemaking, open source software or blogging increasingly obvious, the sheer youth of the open data landscape means truly monolithic intermediaries are yet to form.

That does not, however, mean they never will. In fact, we have shown empirical evidence that points to quite the opposite. There is nothing new about open data flows that make them impervious to shaping and rerouting. Indeed, some degree of manipulation is required if open data is ever to gain traction amongst the developer community – we see the beginnings of such manipulation in the centralized galleries of open data apps, or the competitions drawing attention to one dataset in place of a thousand others. We have seen developers and datasets alike become crucial linking points – crucial gateways for the flow of information

– between sub-communities of open data development based on specific tasks or contexts.

Moreover, where castes of lobbyists came to dominate e-rulemaking, and cliques of citizen journalists came to form echo-chambers in the blogosphere, so too do open data developers act as unelected representatives for the wider citizenry. It is they who find, assimilate and visualize the data for wider consumption. It is through them, through these disconnected and task-focused communities, that information flows. Through the hands of experts, yes, but intermediaries nonetheless.

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