Master of Science in Public Administration – Management of Governance Networks

The Influence of Open Data on Collaborative Governance in Smart Cities

A Case Study in Bristol, United Kingdom

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Summary

Transparency and collaborative governance have lain at the heart of many policy changes in recent years based on their perceived intrinsic merits, forming the foundation of the New Public Governance paradigm. These ideas also form the foundation for prominent programmes of open government at all levels, as well as smart city programmes for cities of varying size. These programmes in themselves have quickly entered the political mainstream and spread worldwide with promises of myriad improvements to society. Much thought has been devoted to developing these concepts theoretically, generating for each of them an ideal type as well as particular mechanisms through which they may be implemented, including open data. But there have been few observations of these principles together in practice to determine if they are capable of fulfilling their ideal type or whether they are indeed compatible with each other.

This thesis performs a case study of these programmes, examining how a transparency measure such as open data may influence collaborative governance in a smart city by contributing to the empowerment of citizens. We analysed qualitative data gathered as in-depth active interviews from respondents in the city of Bristol in the United Kingdom who had some connection to working with open data.

We find that open data does function as a form of transparency, but by itself affects only token forms of participation. Its opportunities to influence empowered participation or collaborative governance are few, as programmes of open government and the smart city are largely missing their collaborative element. This is largely due to greater circumstances such as a political climate of austerity. As such, these programmes fall short of the benefits that have been ascribed in theory. Despite this structural inhibition, much enthusiasm remains for open data and its possibilities, and collaboration on the basis of open data seems very possible. While the theoretical structures of open government and smart cities are not achieved, a different structure is emerging, in which intermediary organizations serve to empower others and also fulfil the role of fostering collaboration. Their capacity for empowerment is more particularly true on broader (national) scales, while fostering collaboration is particularly effective at the community level. Our results support previous research on open data intermediaries, but moreover support the potential of the programs of open government and smart cities, whose shortcomings intermediaries are currently compensating for. There remains a strong argument for a more complete commitment to the ideal types of open government and smart cities, for their social and economic benefits could effectively offset their costs, providing a greater efficiency of governance that austerity has failed to do.

1. Introduction

Transparent and collaborative governance both assert themselves as part of the paradigm of New Public Governance in public administration, encouraged by both advances in information and communication technology and the opportunity to address failures of previous models of public administration to which it stands in contrast (Osborne 2006; Tolbert and Mossberger 2006; Ansell and Gash 2008; Ansell 2012; Harrison and Sayogo 2014). New Public Governance posits "both a plural state, where multiple interdependent actors contribute to the delivery of public services and a pluralist state, where multiple processes inform the policy making system" and as a "consequence of these two forms of plurality, its focus is very much upon inter-organizational relationships and the governance of processes, and it stresses service effectiveness and outcomes" (Osborne 2006, quoted in Osborne 2010:97). These processes and relationships between interdependent actors are what constitutes collaboration, whom together form the plurality of public service delivery. Collaborative processes emphasize deliberation and affect a network structure of horizontal relationships (Ansell 2012).

At the same time, transparency and collaboration are being taken together as complementary mechanisms to form the foundation for programmes of both open government and smart cities (Meijer et al. 2012; Bartenberger and Grubmüller-Régent 2014, Ojo et al. 2015). On December 8th, 2009, Barack Obama issued the Open Government Directive which, as Yu and Robinson (2012) describe, redefined open government and ushered it into a new era. According to Obama, three principles are essential to open government: (a) government must do everything possible to make information available and useful; (b) government must create venues for citizens, stakeholders and employees to share ideas, opinions and priorities; and (c) government must reach across internal and external barriers to solve problems collaboratively (Orszag 2009). Since the inception of the Open Government Partnership in 2011[1], government openness has spread across the world as seventy-five countries have joined. Then in 2013, President Obama signed an executive order, "Making Open and Machine Read-able the New Default for Government Information," which directed that "government information shall be managed as an asset throughout its life cycle to promote interoperability and openness, and, wherever possible and legally permissible, to ensure that data are released to the public in ways that make the data easy to find, accessible, and usable" (Executive Order No. 13,642 (2013); Bertot et al. 2014:8).

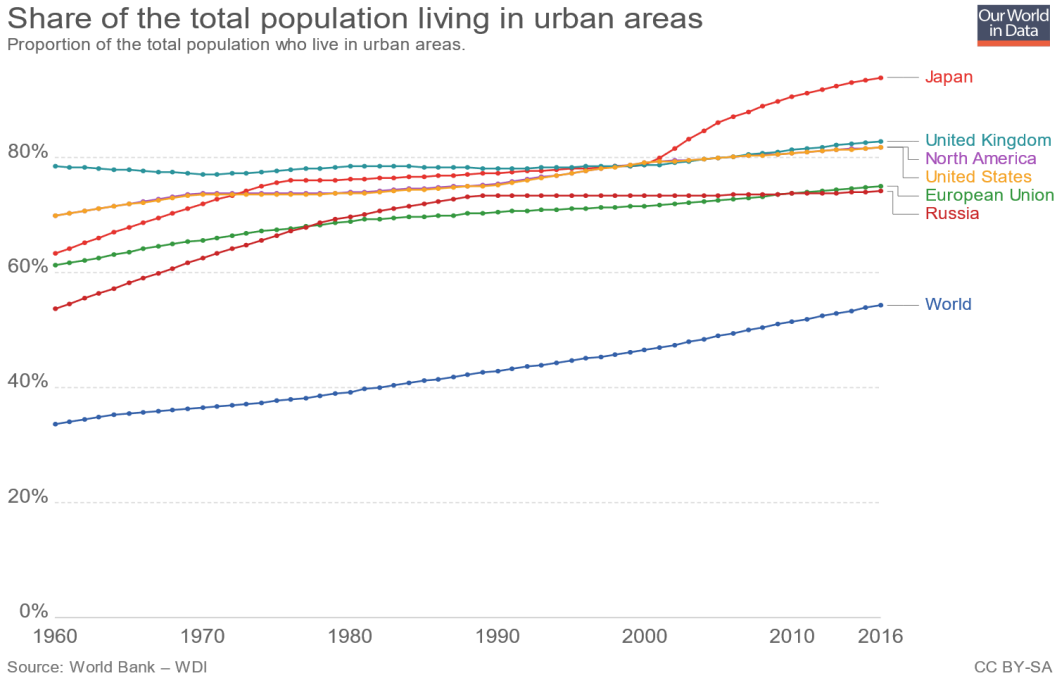
The characteristics of open data are designed to have a number of effects, which relate to two themes. The first is open data as a transparency measure that will enhance democratic processes

[1] https://www.opengovpartnership.org/about/about-ogp retrieved 24/05/2017

throughout the structure of democracies, and the second is data as a public resource which may be drawn upon for the sake of innovation (Janssen et al. 2012; Ruijer et al. 2017). The desired effect of both of these themes is principally the alleviation of social and civil problems. Open data is somewhat conceived of as a bezoar, a cure-all in the alchemy of civilization. Open data and smart cities have converged on this basis, developing a reciprocal relationship in which open data helps a smart city achieve its objectives while the smart city endeavours to provide the appropriate environment and infrastructure for rich data collection, dissemination, and reuse (Bartenberber and Grubmüller-Régent 2014; Ojo et al. 2015). Furthermore, collaboration has been previously identified as among the largest determinants of the success of open data (Verhulst and Young 2016).

The enthusiasm for these programmes is merited by the recognition that civilization is taking on a design never before seen in history. Most definingly, it was recently recorded (2007, according to the World Bank[2]) that over half of the world's population now live in urban areas, while proportions of the Global North are much higher (see Figure 1)[3].

Figure 1: Urban Population



This trend is only set to continue, with 68% of the world's population living in urban areas by 2050 (Desa, 2018). The governance of cities now concerns the majority of the world's citizens, and there is increasing pressure to introduce 'smart' measures to cities to manage the complexity and strain of

[2] https://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?contextual=region&end=2017&start=2000&view=chart accessed 30/10/2018

[3] https://ourworldindata.org/urbanization#recent-urbanization accessed 30/10/2018

supporting such dense volumes of people. The unprecedented levels of urban population have brought new and more complex challenges in terms of supply and sustainability of resources such as water, food, energy, space, as well as services such as transport and the other amenities of civilization (Rodriguez-Bolivar 2015; Anttiroiko et al. 2014). Problems of such unrelenting and inextricable complexity are also called wicked problems. Smart cities have been posited to address wicked problems, to recuperate some efficiency previously lost out of poor past urban planning, and revitalize existing relationships among the 'civic and governmental infrastructure' (Caragliu et al. 2011; Batty et al. 2012; Bakici et al. 2012, Gollagher and Hartz-Karp 2013:2345, Goodspeed 2014). Open data has already been recognized as one of the measures by which a smart city may be implemented, and collaborative governance is another (Gollagher and Hartz-Karp 2013).

1.1 Problem Statement

As we can partially see already, open government programmes and smart city projects depend on a deep understanding of the functional relationship between transparency, open data, empowerment, participation, collaboration, and the use of technology to enhance those. However, many of the concepts involved here have been defined and developed concurrently even as they are nested within each other. These concepts have since begun to settle down into an ideal type for each. A practical ideal type is a standard, 'best' model of programs and their processes developed from the theoretical literature, providing criteria and working hypotheses to which empirical evidence can be compared and contrasted (Shields and Tajalli 2006). Case studies are necessary to observe whether these ideal types have been or can be properly implemented, or are compatible in practice. Where these concepts have been implemented in public administration, the variety of mechanisms used will also shape how their relationships manifest. Determining the appropriate design and structure of these programmes for given contexts, including the mechanisms that will fulfil their principles, will require more research to which this thesis hopes to contribute.

1.2 Research Aim and Question

Open government and smart cities both feature a conceptual fuzziness that, as they have been clarified, have converged to expound the principles of New Public Governance. Further clarification is needed, and unique practical concerns remain for each. The success of this new paradigm depends on a deep understanding of the functional relationship between its principles, the programmes where they are implemented, and especially in practical cases such as open government data. While previous studies have examined how open data is presented as a feature of a smart city (Ojo et al. 2015), this thesis specifically examines how this presentation influences collaborative governance.

The question this thesis aims to address is how the open government and smart city mechanism of open data, as a form of information transparency, influences collaborative governance.

The sub-questions for our thesis will involve assessing each component of this question.

There is a need to determine:

- **How are the concepts of open data and smart cities described in the literature?**
- **How is collaborative governance defined?**
- **Is open data used in governance?**
- **Are citizen users of open data empowered to participate in governance?**
- **What qualities does such public participation have?**

Open data has been postulated to enhance collaborative governance in a smart city by Bartenberger and Grubmüller-Régent (2014). This research hopes to answer their calls for empirical investigation of these concepts, for which they traced a theoretical framework. Our own theoretical framework will be developed below, but naturally there will be a great deal of overlap.

The use of open data, citizen participation, and collaborative governance are intrinsically built upon the relationships between citizens and government, between state and non-state actors. Therefore, the research subjects will be representative of both sides of this relationship. However, primacy will be given to the users of open data, which is presumed to be citizens or non-state actors. The research question assumes that the opening of government data has already been implemented to a certain extent; as an action or programme of government, their role has already been performed. It is essentially the response of actors other than government that is here being investigated, and implies a focus on these actors.

The research will be performed in the setting of a 'smart city' and in the context of 'open government', as areas that emphasize the research variables as aspired qualities and presumably will have a greater presence of these qualities, in the vein of an extreme case characterized by Flyvbjerg (2006). Extreme cases will naturally produce actors more engaged with or dependent on these aspects of their environment for their public or working lives, and the basic mechanisms underlying this environment will be more visible. Focusing the research in this context is meant to enhance the quality of the research and make the research easier to perform.

1.3 Societal and Academic Relevance

The programmes that inform the context of this research, open government and smart cities, have an immense potential to impact people's lives. They are both being precipitated by new opportunities, such as stimulating innovation and economic growth (Janssen et al. 2012; De Blasio and Selva 2016), but are also being developed out of necessity, in response to rising tensions, growing threats, and emerging complexity. Among these are the challenges posed by becoming a majority urban species mentioned in the Introduction. But even before we crossed this threshold, Peter Dahlgren spoke of a general international consensus that democracy has hit upon dark times

since the early 1990's, for reasons that included a growing heterogeneity of society and a growing portion of cynical and disengaged citizens, that reflected a broad trend of a breakdown in political communication (Dahlgren 2005:147; see also Blumler and Gurevitch 1995). The late Zygmunt Bauman wrote at length on the 'liquidation' of modern society, referring to the ephemeral nature of relationships and overwhelming uncertainty, a lack of security portrayed as a lack of solidity (Bauman 2013). But there remained hope that the internet and communications technology more broadly could have a positive impact. For instance, of the hundreds of drivers identified in a SWOT analysis of smart cities, the most impactful were participation and communication, and a more open government is designed to restore trust in political elites (Pezzutto et al. 2016). Our research is not only relevant to the billions of people whom these programs will affect, but to the shape of the democracies that hold them together.

Aladalah et al. (2015) felt that despite recent introduction of technology into government that could enhance citizen participation, participation and its issues had not been systematically studied. Here too we feel that given the worldwide fervor for open government and smart city programmes, their promises and potential to affect entire populations, there must be closer systematic study of them, their components, and their reception by both public citizens and public bodies including the administrations charged with their development and implementation. For all their good intentions, there is simply not enough evidence to be convinced of their efficacy, and some scholars such as Gurstein (2011) remain heavily skeptical.

Finally, as these programmes contain all the elements of New Public Governance, they have become representative of this paradigm as a whole (De Blasio and Selva 2016). The results of the implementation of these programmes will stand to shift the paradigm of public administration further towards New Public Governance or away from it, and will be primary pieces of evidence called upon to judge its efficacy. This research intends to contribute to that body of evidence.

1.4 Chapter Outline

In the following chapter care will be taken to outline the concepts of open data, transparency, empowerment, and collaborative governance, as well what is relevant of open government and smart cities. Having provided a clear background that informs our conceptual framework, the research design and methods will be explained in Chapter 3. The data gathered through these methods will be presented in Chapter 4 as descriptive analysis of our findings. An exploratory analysis of these findings will follow in Chapter 5. Conclusions to be drawn, including recommendations and research limitations, will comprise Chapter 6.

2. Theoretical Framework

2.1 Introduction

In this section, the concepts of open data, transparency, and collaborative governance will be defined, and their relevance to open government and smart cities explained. We will begin by outlining the close similarities between open government and smart cities. The following subsections will detail their common components of transparency, specifically open data, participation, specifically empowerment, and collaboration and collaborative governance. We will elaborate on these concepts to provide a clear conceptualisation for the research purposes.

2.1.1 Open Government

Technology has always augmented politics and the administration of public policy, never more so than in the 20th century (Harrison et al. 2012). Citing particularly Castells's theory of the Network Society (2006), Linders (2011) explains that information technology has provided tools that are reshaping and diversifying the relationship between citizens and government. These technologies, part of the phenomena known as Web 2.0, include social networks/social media, wikis, blogs and similar (Bertot et al. 2012). The implementation of these technologies has reached all parts of the public sector, and has given rise to concepts such as 'e-government' and 'government 2.0', while also setting the stage for open government (Linders 2011; Veljković et al. 2014; Aladalah et al. 2015; Attard et al. 2015; Wirtz et al. 2018; see Table 1 below).

Table 1 : Open Government and Related Concepts

Concept	Description	Reference
Freedom of Information Act (1966)	"public access to previously undisclosed government information."	Yu and Robinson (2012)
Government 2.0	"The use of social networking platforms, content creation and sharing tools, blogs, and microblogging tools within government organisations and their interactions with citizens."	Mergel (2012) (quoted in Aladalah et al. 2015)
E-government	"the use of electronic processes by citizens, businesses and the government to communicate, to disseminate and gather information, to facilitate payments, and to carry out permitting in an online environment."	Wyld (2004)
E-governance	"programs that invite citizens to engage in the policy processes of oversight through a range of technologies from e-mail, to social networking applications, and online conferencing."	Cullen (2010) (quoted in Harrison et al. 2012)
Open Government	"citizens not only have access to information, documents, and proceedings, but can also become participants in a meaningful way"	Lathrop and Ruma (2010)
Other terms:	E-Democracy, e-participation, m-government, transformational government, wiki government (Noveck 2009).	Kumar and Sinha (2007)

Open government appears to be a movement compelled by technology more so than an integration of technology (Dunleavy et al. 2016). The culture of anonymous collaboration on the Internet, as per the wildly successful "wiki" model of a community structured by many horizontal and often ephemeral relationships, has resulted in "a resurgence in theories of direct and deliberative democracy," as collaborators working in deliberative and directly democratic environments realize that there is little preventing these processes from being applied to the public sphere (Noveck 2009; De Blasio and Selva 2016:227). Simply put, information and communication technologies have affected government in such a way that citizens are now demanding open access to information and constant communication. Because greater communication is now possible, citizens are now expecting their voices to be heard, their input to be recognised, as well as demanding the ability to monitor their governments to ensure that they are listening. This has the effect of eroding power structures such that the relationship between citizens and government settles on ever more equal footing.

Open government also has its ancestry in freedom of information legislation which appeared across the world as early as the 1950's (Clarke and Margetts 2014). Worthy (2010) concluded from Mendel (2008) that the common principles driving such legislation were transparency, accountability, participation, and the informing of citizens (Worthy 2010:564). Although the traditional definition of open government is grounded in transparency, some authors have noted that in recent times the concept has begun to be further stretched to include participation, collaborative governance, and the use of digital technology to enhance those (De Blasio and Selva 2016:227). These principles were first collated within Barack Obama's 'Open Government Directive,' which held transparency, participation, and collaboration as its three fundamental pillars (Orszag 2009). This new definition takes on dimensions that drastically alter the concept as a whole, and which have not been adequately researched (Hartog et al. 2014). What has remained however is the idea that open government is a progressive stage model, in which state transparency enables participation which may mature to a collaborative form governance where the power in decision making is equal among all the participants (De Blasio and Selva 2016:230). After systematic review, Wirtz and Birkmeyer (2015:392) define open government as,

> *"a multilateral, political and social process, which includes in particular transparent, collaborative and participatory action by government and administration. To meet these conditions, citizens and social groups should be integrated into political processes with the support of modern information and communication technologies, which together should improve the effectiveness and efficiency of governmental and administrative action."*

2.1.2 Smart Cities

The smart city has also evolved through many conceptions that have been analysed at length (Caragliu & Del Bo 2012; Batty 2013; Albino et al. 2015; Angelidou 2015; Meijer and Bolivar 2016). Originally a techno-futuristic concept, it has since settled down on more of a dualistic nature. The technological focus remains on the one side, used in improving the efficiency of public services and the city's operations through constant monitoring (Hall et al. 2000). The other side includes fostering a greater amount of interaction with the citizenry that forms the context of the city (Caragliu et al. 2011; Anttiroiko et al. 2014). It is this second element that sets smart cities apart from the other concepts with which it has sometimes been interchanged previously (see Table 2 below) (Dameri & Cocchia 2013; Schaffers et al. 2011; Schuurman et al. 2012). A smart city is also commonly divided into six main characteristics to allow for more acute focus in implementation phases – smart economy, people, governance, mobility, environment and living.[4]

Table 2 : Smart City and Related Concepts

Concept	Description	Reference
Smart City	"when investments in human and social capital and traditional (transport) and modern (ICT) communication infrastructure fuel sustainable economic growth and a high quality of life, with a wise management of natural resources, through participatory governance."	Caragliu et al. (2011)
Intelligent City	"a territory with developed knowledge-intensive activities or clusters of such activities; with embedded routines of social co-operation allowing knowledge and know-how to be acquired and adapted; with a developed communication infrastructure, digital spaces, and online knowledge and innovation management tools; and with a proven ability to innovate, manage and resolve problems that appear for the first time, since the capacity to innovate and to manage uncertainty are the critical factors for measuring intelligence."	Komninos et al. (2007, see also 2002, 2009)
Digital City	"a connected community that combines broadband communications infrastructure to meet the needs of governments, citizens, and businesses"	Ishida (2002) (quoted in Albino et al. 2015)
Ubiquitous City	"an extension of the digital city concept in terms of wide accessibility. It makes the ubiquitous computing available to the urban elements everywhere."	Albino et al. (2015)
Virtual City	"the city becomes a hybrid concept that consists of a reality, with its physical entities and real inhabitants, and a parallel virtual city of counterparts, a cyberspace."	Albino et al. (2015)
Knowledge City	"an integrated city, which physically and institutionally combines the functions of a science park with civic and residential functions."	Yigitcanlar et al. (2008)
Technopolis	"interactively links technology commercialization with the public and private sectors to spur economic development and promote technology diversification."	Smilar et al. (1988)
Other terms used:	wired city (Dutton, Blumler and Kraemer 1987), informational city (Castells 1989), advanced information city, invisible cities (Batty 1990a), resilient city (Newman, Beatley, & Boyer 2009), biophilic city (Beatley & Newman 2013) computer city, plug-in city, cyber city, fiber city, software city, wiki city, sustainable city, city 2.0, innovative city, creative city, smart communities, media city	Arribas-Bel et al. (2015); Anttiroiko et al. (2014); Caves (2004); Batty (1990b)

[4] www.smart-cities.eu/?cid=2&ver=4 accessed 5/12/2018

The smart city as it has evolved has developed a step-like nature similar to open government, of which the implementation of technology is just the first step (Schaffers et al. 2011). Realizing that technology alone is not sufficient, now the impetus is for citizens to leverage it to engage in governance and the creation of public value, and for the government to arrange this (Caragliu et al. 2011; Lombardi et al. 2012; Bartenberger and Grubmüller-Régent 2014). A smart city is still highly predicated on technology – it is primarily dependent on a technical enrichment of its infrastructure to provide data on its environment and better capacity for integrated management (Schuurman et al. 2012; Batty 2013).

But left to its own devices, there is considerable worry that the smart city will instead create distortions in the labour market that will contribute to gentrification and inequality, undermining the entire endeavour (Hollands 2008). As the structural effects of information technology are being scaled up to the level of the urban system, a humanistic or socio-political enrichment is now deemed necessary as the means for scrutinizing, managing, and innovating upon that data as a collective (Schaffers et al. 2011; Meijer and Bolivar 2016). A cohesive smart city strategy must capitalize both on technology and on knowledge (Harrison et al. 2010; Caragliu & Del Bo 2012; Angelidou 2015). The 'socio-technical infrastructure' that results includes transparency as part of the "contextual factors that need to be present in an ecosystem in order for it to be able to fully exploit the potential of ICT" (Ferro et al., 2013, quoted in Bartenberger and Grubmüller-Régent 2014:37). A city can only behave smartly when its citizens have access to information that allow them to make smart decisions. A city, after all, is determined by the sum of its inhabitants. Aguilera et al. (2017) argues that cities may become smarter still if citizens not only have access to information but are also able to contribute to it. 'Smartness' as such has since been reconceived as a gradual measure, relating to the presence of these elements and to each of the six characteristics listed above, which may be assessed independently through a number of indicators (Giffinger & Gudrun 2010; Caragliu & Del Bo 2016; Gil-Garcia et al. 2016; Meijer & Bolivar 2016).

However, there are structural concerns to the implementation and operation of a smart city thus defined. The digital renovation and operation of infrastructure is highly complex, requiring large amounts of specialized knowledge and personnel. Such an environment may be averse to more collective or collaborative forms of governance. High numbers of participants, a large need for coordination, and a low problem consensus derived from the specialized knowledge involved (which extends into a low consensus on implementation and operation), are aspects of organisation explicitly described by Provan and Kenis (2006) as being so problematic as to increase the likelihood of a concentrated body of governance. While following sound motivations, such a concentration of governance undermines the vision of a smart city by failing to activate and include the citizens in

contributing ‘smartness’ other than by contributing data to be used by decision makers. Similarly, conceiving of a smart city in merely a technical sense may lead to governance remaining in the hands of central steering actors (Meijer and Bolivar 2016). This also falls short of including collaborative governance. Yet this often occurs, as the idea of a smart city is still mostly predicated upon technological sophistication.

Theoretically then, while open government and smart cities share common principles which are intended to complement each other in similar ways, there are conflicting dynamics described. Technology is their common foundation. But perhaps ironically, technology appears to enable the former merely out of circumstance, while confounding the latter of which it is meant to be an intrinsic part. Information technology has begotten the opening of government almost as a side effect of its saturating the world, facilitating a greater involvement of citizens and effortlessly breaking down previous structures of government. But whereas the same technology has directly enabled the creation of smart cities, such projects are as of yet so complex as to prevent citizens from meaningful participation, despite such participation being crucial to the concept of the smart city’s success. Collaboration is encouraged in the former, and deterred in the latter. These dynamics need to be closely monitored in practice.

2.2 Open Data

While open government may be understood as a governmental attitude or process, open government data is often how it manifests and is implemented (Janssen et al. 2012; Attard et al. 2015; De Blasio and Selva 2016; Wirtz et al. 2018), so much that the former is thought to be unachievable without the latter (Bartenberger and Grubmüller-Régent 2016). Open data is based on the idea that certain kinds of data should be exempt from copyright, patents, or censorship, as it is a resource that creates opportunities for individuals, private sector organizations, and non-profits to find new insights, innovate, and create new products and services (Bertot et al. 2014:6; Danneels et al. 2017). It is generally acknowledged that activism around open data is rooted in hacking culture (Baack 2015:2), often and best represented by the adage, “information wants to be free.” There is a strong argument for the opening of government data, as there exists large and longstanding amounts of it already collected and organized at a high level of detail as a matter of public record and for the benefit of government decision makers (Davies 2010; Janssen et al. 2012; Dunleavy 2016). That is to say in short that government data is usually good data. It has been paid for by taxpayers, is relevant, and offers value beyond what is captured from the originally intended use, if only they become a shared resource (Chan 2013; Jetzek et al. 2013). Data has often been provided to the public before coming under the banner of open data programmes; what unique qualities an open data programme entails is often a centralised platform and the provision of machine readable

formats (Chan 2013). Among the promises of open data are efficient and effective government, innovation and economic growth, overall transparency, accountability, inclusion and empowerment (Hartog et al. 2014:53). Gonzalez-Zapata and Heeks identify four categories of benefits which can be associated with open government data: better (more accountable) governance through transparency and optimization of public service delivery, and technological and economic growth through innovation (2015:2).

Dunleavy (2016) distinguishes two main sources of data for public policymakers. The first of which is administrative records, which have been meticulously collected in the normal process of operating a public administration and producing statistics on social, economic, political conditions upon which policy may be based. The second of which is the 'digital residues,' which are the electronic records of access and usage of technology and software, that remain after such use has been completed. These include logs of phone calls, emails, or cookies on a web browser, which are actively collected and can be analysed for patterns. These sources each have their strengths, and while governments are built upon administrative data, we may expect to find an interesting mix in such a context as a smart city, where digital residues are important to operating smart city subsystems (Meijer and Bolivar 2016).

The concept of "open data" is all encompassing, yet care is needed to define clearly what both 'open' and 'data' mean and what they mean together. 'Openness' is a concept convoluted with transparency, and will be elaborated on in the next section. For now it will suffice to point out that while disclosure and availability are one aspect of openness, quality, comprehensiveness, and usability are another. This is especially true when it comes to data, where not just the devil lies in the details. Data that is available may be of poor quality or in a raw, unprocessed state that is incomprehensible to the regular citizen, it may be uncertified or collected using faulty methods that can lead to incorrect findings, or it may simply be irrelevant to the user, all of which can undermine the policy making processes (Bertot et al. 2014).

The term 'data' itself may also in practice be convoluted with 'information' and 'knowledge,' though care is taken to theoretically differentiate between them which will be repeated here. Data is defined as 'raw symbols' or 'discrete objective facts' that have no value in itself; they only become valuable when transformed into information when placed into context, which is transformed into knowledge by the interpretation of the user (Agranoff 2006; Janssen et al. 2012:260; Baack 2015:4). Therefore, a key element of open data governance is to consider one's audience. The value of this knowledge may be subjective, but does mean that supporting use of open data should not be viewed as secondary to publicizing it (Janssen et al. 2012; Ubaldi 2013).

But elsewhere it is noted that that the use of open data is not guaranteed – one should not assume, 'if you build it, they will come' (Edelmann et al. 2012; Chan 2013). The barriers to open data are numerous and scattered along the path, from data not existing in digital form, to a government reluctance to release it, to quality issues and confusion over licenses (Gonzalez-Zapata and Heeks 2015; van Schalkwyk et al. 2016). Various investigations have found governmental agencies do not have effective strategies to stimulate citizen's use of open data and encourage participation (Zuiderwijk and Janssen 2014; Attard et al. 2015:33). There are widespread concerns that open data will only widen the digital divide – that only those with material privilege and the right education will be able to make the best use of open data (Gurstein 2011; Meijer et al. 2014; Torfing et al. 2016). Scholars have also noted that the empowerment that open data offers might lead to information overload, as is so very possible in the Information Age (Aladalah et al. 2015:89; Matheus & Janssen 2013). In turn, this may produce dissatisfaction, deterrence, and less transparency (Meijer et al. 2014).

To bridge the remaining gap and avoid these possible outcomes, the role of 'intermediaries' in promoting open data and facilitating collaboration is starting to become recognized, even being referred to as the new 'infomediary' business sector (Baack 2015; Gonzalez-Zapata and Heeks 2015; Berrone et al. 2016; Schrock and Shaffer 2017). Schrock and Shaffer (2017) identify these intermediaries as a way to achieve goals of collaborating with the public while having limited government overhead. Gonzalez-Zapata and Heeks (2015) identified five different roles that these intermediaries play, demanders, producers, validators, developers, and communicators of open data. This is in accordance with the sequence that data follows towards becoming open, and then valuable and useful knowledge. Van Schalkwyk et al. (2016) relate this sequence and the actors within it to an ecosystem, much like a food chain, and intermediaries comprise the 'keystone species.' The question, therefore, is whether this ecosystem can find a sustainable equilibrium.

2.2.1 Conceptualisation and Practical Ideal Type

Open data is defined in straightforward fashion by the Open Data Institute as 'data that anyone can access, use, or share.'[5] Meijer et al. (2014) explicate this definition as 'government data are technically accessible for use by citizens and stakeholders without legal, economic, or political restrictions' (Meijer et al. 2014:105). These definitions stem from a set of criteria developed in relation to Freedom of Information legislation in 1965: completeness, primacy, timeliness, ease of physical and electronic access, machine readability, non-discrimination, use of commonly owned standards, licensing, permanence, and usage costs (Schrock and Shaffer 2017). Ren and Glissman

[5] https://theodi.org/what-is-open-data

(2012) propose six similar themes for identifying information assets as open data: accessibility and availability, understandability, completeness, timeliness, error free and security (quoted in Veljković et al. 2014:281). Furthermore, the data sets must consist of reliable, useful, and valid data (Harrison et al. 2012), and Trivellato et al. (2014) add 'primacy', 'license-free,' and 'machine-readable' to this list of keywords. Bogdanović-Dinić et al. (2014) also compile a helpful list of similar criteria from various sources.

Here we condense these previously listed qualities into a practical ideal type which will be operationalised and assessed in the course of the research.

Open Data must be:

- **Available – Always online and free**
- **Accessible – Well-organised and integrated, understandable, machine-readable**
- **Reliable – Authorized, secure, complete, correct**
- **Reusable – For redistribution, processing and analysis**

2.3 Transparency

Just as open government and open data are conflated concepts, openness and transparency are often used interchangeably (Meijer et al. 2012). To hear the concepts said together is often merely a linguistic device meant to emphasize the point, to affirm the enthusiasm for transparency in government today, rather than introduce them as distinct concepts (Heald 2006; 2012). It appears that while transparency once encompassed openness and extended beyond to include simplicity and comprehensiveness (Larsson 1998, quoted in Heald 2006), more recently Meijer et al. (2012:13) conceive of openness of government as 'the extent to which citizens can monitor and influence government processes through access to government information and access to decision-making arenas'. Focusing on the word influence, recall that open government has evolved from transparency and accountability to include participation and collaboration (De Blasio and Selva 2016; Edelmann et al. 2011), suggesting a participative complement to transparency. The timeline of the sources above illustrates how the concepts appear to have subsumed each other over time.

Heald (2006) differentiates transparency along two dimensions, vertical and horizontal. Vertical transparency may be upwards and downwards, horizontal transparency may be inwards and outwards (implying a boundary). These dimensions of transparency are not mutually exclusive. Transparency upwards relates to principal-agent relationships, as those higher up in the hierarchy are able to observe their subordinates. Transparency downwards occurs when the ruled can observe the rulers, which is the primary conceptualisation of transparency in democracy. Transparency inwards and outwards is much the same, except across organizational boundaries. Transparency outwards is being able to observe the environment, while transparency inwards involves those

outside an organisation being able to observe what is occurring inside of it. Transparency inwards and its perceived merits is the basis upon which freedom of information legislation is built. Open data may be characterized as transparency downwards and inwards.

In addition to the directions of transparency there are certain varieties that are important to this thesis. Heald (2006) distinguishes being between event and process transparency, in which events concern inputs, outputs, or outcomes, which are linked by processes (Heald 2006:30). Process transparency may be broken down further into procedural and operational components. Procedural relates to the rules, regulations, and other formal institutions in place that transform inputs to outputs, and operational refers to how these institutions are applied in practice. The biggest distinction between them is the fact that events are definitively measurable, while the processes can only be described.

Finally, the central role that information technology plays in transparency through collecting, organising, and disseminating data as well as through generating models for understanding means that modern transparency is fully mediated, in the sense that *how* it is represented is as important as *what* it is that is being represented (Meijer 2009). Transparency is said to have a triangular relationship with openness and surveillance (Heald 2006). A habit of mediation that greatly affects transparency is that it is often a one-way communication, or surveillance. The same may be said of open data, but in a different way. Data or information is made transparent through disclosure, but to whom exactly it is being disclosed to is obscure; one may contrast surveillance with 'broadcast'.

2.3.1 Conceptualisation

Transparency can be defined most basically as the availability of information about an actor allowing other actors to monitor the workings or performance of this actor (Meijer 2013:5). The concept is employed in public policy by De Ferranti (2009), to refer to "the availability and increased flow to the public of timely, comprehensive, relevant, high quality and reliable information concerning government activities" (quoted in Harrison et al. 2012:3).

Snellen (1994) distinguishes three types of transparency (adapted from Bekkers and Moody 2014). First, there is informational transparency. Harrison and Sayogo (2014) adapt information transparency to open government to describe "a condition in which citizens have access to the data and documents that bear upon actions and decisions taken by government actors" (Harrison and Sayogo 2014:513). Open data embodies this kind of transparency directly.

Secondly, there is analytical transparency, which refers to the possibility to better understand the nature of specific issues or the effects of specific measures through the use of different perspectives

that are based on the combination of different but relevant data (Bekkers and Moody 2014). This kind of transparency functions as a driver for open government, that the inclusion of diverse citizen perspectives may find innovative uses for public data.

Thirdly, transparency may function by integrating different data, but also different perspectives, into one 'whole' or sequence of images that is easier to comprehend. This is called integrative transparency (ibid). Integrative transparency is the essential idea behind the smart city; in its various conceptualisations, the vision of a smart city involves using information technology to generate and integrate that city's data for a better understanding of the city's mechanics and needs.

It is rather useful to envision Snellen's classifications of transparency as capable of progressing in stages defined in sequence above, as we may surmise that each kind of transparency includes the types of transparency before it. This furthermore helps illustrate the ideal dynamics between the components of open government and smart cities. Open data begins as information transparency, from which analytical transparency is generated by the new and diverse perspectives of those who use it, which when communicated leads to a better, more comprehensive awareness of the environment from which the data was generated – an integrated transparency. The results of which are meant to facilitate achieving the visions set by open government and smart cities.

Meijer et al. (2012) have suggested that there is no ideal type of transparency, and that appropriate transparency measures are context-dependent (see also Heald 2006; 2012). However, common themes throughout the context include changes in technology and the changing role of the state that encourages transparency (Heald 2012).

2.3.2 Transparency and Open Data

Open data may be characterized as **'computer-mediated, event-oriented, informational transparency downwards and inwards.'** It is essentially computer-mediated, as its dissemination without information technology would not be practical. It is event-oriented rather than process oriented as in the majority of cases the data is indicative of inputs and outputs, while transparency of process is a different matter entirely. It is downwards and inwards as it allows the 'ruled,' that is to say the citizens, to look 'into' government, in so far as the data is generated and published by the government. These aspects of open data naturally structure how it is used.

Open access to government data is in itself not a comprehensive measure of transparency (Jetzek et al. 2013), that is to say that transparency cannot be achieved through the mere downloading of data sets (Harrison et al. 2012:7). As was said earlier about smart cities and open data, those introducing transparency must consider one's audience as the ones receiving, interpreting, and using the

information. Otherwise, transparency cannot be effective (Heald 2006:35). Data becomes information when it is contextualized, and knowledge when this information is interpreted (Baack 2015). Data is said to be context-specific, and without in-depth knowledge of the context in which the data is collected, interpretation will likely be wrong (Matheus et al. 2018:2), and furthermore information can become decontextualized by mediation, meaning that the receiver must engage in a new interpretation (Meijer 2009). Only offering an interpretation of raw data without allowing access to it would make it difficult for others to understand how this interpretation was developed (Baack 2015), and to offer summaries of raw data would not equate to effective transparency as Heald (2006) conceives of it. To follow this method will at the very least cause confusion, as no two interpretations can be expected to be absolutely similar; if everyone is left to their own interpretations, the resulting discrepancies and disagreements would lead to a political deadlock. Edelmann et al. (2012:34) decide that full, functional transparency would only be achieved through the disclosure of data by legal obligation, *and* the active fostering of collaboration between government entities and with stakeholders. Therefore, one could speculate that open data would be used most effectively in a collaborative atmosphere. As Davenport and Prusak (1998:5) define knowledge, "a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information," applying collaborative mechanisms such as joint fact-finding to interpreting open data will result in shared learning and the frame alignment of stakeholders, ensuring a more homogenous transparency and an open government that is not only holistic in its processes but stronger as a result. The vision of open data, to foster innovation, is dependent on the establishment of shared interpretations (D'Andreta et al. 2016:2). To do otherwise runs an unnecessary risk of dissonance. The conflation of transparency with collaboration will only grow deeper with the next section.

2.4 Participation and Empowerment

Like transparency, public participation can be instrumental in helping contemporary governments address the problem of legitimacy (Harrison et al. 2012:4). Proponents of transparency argue that transparency will empower citizens, and, in the end, these empowered citizens will engage with the system that has empowered them, making transparency a trust-building measure (Edelmann et al. 2012; Meijer 2015). Technology can be instrumental in helping to increase participation (as already recognized in the concepts of 'e-government' and 'government 2.0'). The technology of the Information Age can make public information more adaptable, giving citizens among other non-state actors enhanced capabilities for self-organization and value creation, to contribute across many aspects of civic life in exciting new ways (Linders 2011; Yu and Robinson 2012). Specifically, an

increasing number of open data initiatives ideally would result in increased transparency, participation, and innovation (Attard et al. 2015).

Participation generally means inclusion of stakeholders in the decision-making processes that affect them (Huxham et al. 2000) but does not take for granted that non-state actors are able to influence decisions and play an active role in the process (Bartenberger and Grubmüller-Régent 2014:39). Citizen participation in policy-making via information technology forms a scale from enabling to engaging to empowering (Aladalah et al. 2015) and is obviously derived from Arnstein (1969)'s well-known 'Ladder of Participation'. Enabling is about providing relevant information in an accessible and understandable format. Transparency is in itself an enabler to the creation of value from data (Jetzek et al. 2013), but only insofar as it presents the opportunity for value creation. Engaging is concerned with consulting a broader audience of citizens about a government initiative (Aladalah et al. 2015:79). Enabling and Engaging are top-down perspectives, administered by governments themselves and, and do not include any meaningful decision-making, would be referred to by Arnstein (1969) as 'token' forms of participation.

Empowering comes from a bottom-up perspective, and is about citizens being producers rather than consumers of policy, taking a central rather than peripheral role (Aladalah et al. 2015; Huxham et al. 2000). The concept of empowerment is both psychological and political, both personal and public. It is thought to be 'a process by which individuals gain mastery or control over their own lives and democratic participation in the life of their community' (Zimmerman and Rappaport 1988:726).

Open data's relation to this scale is convoluted. From a government perspective, open data is an act of enabling that serves as an invitation to engage, while from a citizen's perspective is an opportunity for self-empowerment. Open data activist groups pursue an overall vision of citizen empowerment, as participation *with substance*, in the belief that sharing raw data should not only help citizens to better understand and control their governments, but to be more active and engaged in their local communities (Baack 2015). Open data, as a digital form of self-service, is a first step in involving citizens in the co-production of public services and exploring further steps of co-creation (Torfing et al. 2016). Open data can only empower if it is able to be repurposed (Eaves 2009), and as this implies a transcendence of domains, any such use of open data would presumably foster a community based on engagement, collaboration, and co-production (Bertot et al. 2014). Lastly, collaborative governance itself has been conceived as 'empowered participatory governance' (Ansell 2012), supporting the conjecture that open data is a means of achieving it.

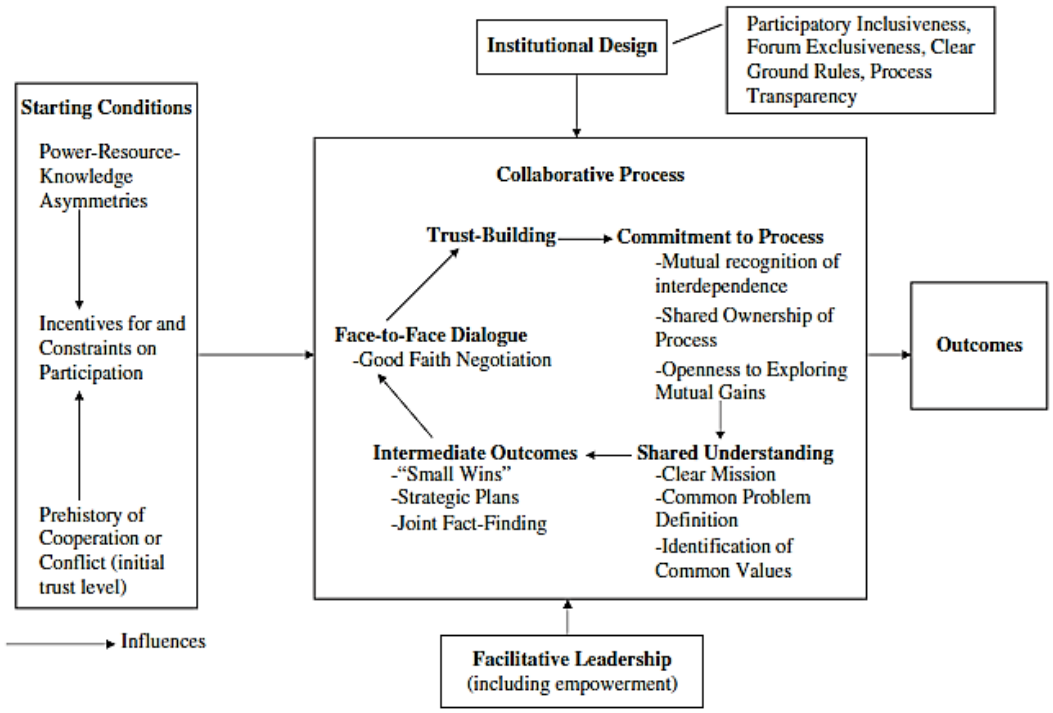
2.5 Collaborative Governance

Collaboration is a process neatly counterpoised against command or competition, the modes of previous paradigms of public administration (Huxham et al. 2000; Linders 2011; Ansell 2012). Collaborative governance is becoming more important as a consequence of the growing information economy and the complexity of urban systems (Agranoff and McGuire 2004). The complexity of the contemporary world leads to a great deal of uncertainty, which manifests as 'wicked problems' (Koppenjan and Klijn 2004). Wicked problems are persistent, dynamic, and social in nature - how they are defined differs among the stakeholders that are affected by them in constant and diverse ways (Rittel and Webber 1973).

In the course of managing wicked problems, actors are driven to solving them collaboratively as they find themselves interdependent in terms of resources and expertise, are motivated to alleviate the risks of combating complexity through sharing responsibility, and are compelled by a democratic obligation to involve affected stakeholders (Booher 2004; Agranoff 2006; Linders 2011). Thus, this environment alters the structure of social relations such that relations are typically horizontal, begetting collaboration as the more natural mode of interaction (Ansell 2012). The central defining characteristic of horizontal relations between actors is that decisions are based on consensus (Agranoff 2006). However, these lateral connections often seem to overlay existing hierarchies rather than act as a replacement for them (ibid:58). For this reason, collaborative governance, as an enhanced interactivity between citizens and government, is described as cross-boundary (Emerson et al. 2012:4).

Collaborative governance also recognizes the large and growing capacity to create public value that exists outside of government. The benefits of institutionalised collaboration are manifold, including joint-learning of social and technical skills for the individuals, access to information or resources creating opportunities for mutual gains for those involved, understanding of other perspectives through collective process skills for the interacting organisations, and a stronger legitimacy of decisions for the object of the collaboration itself, be it an action plan or policy change etc (Agranoff 2006; Ansell 2012). A full diagram of beneficial mechanisms of collaborative governance from Ansell and Gash (2008) is found in Figure 2.

Figure 2: A Model of Collaborative Governance



In its most broad conception, collaboration is "a process in which autonomous or semi-autonomous actors interact through formal and informal negotiation, jointly creating rules and structures governing their relationships and ways to act or decide on the issues that brought them together" (Thomson et al. 2007:3). This includes deciding what information is necessary and how costs and benefits will be distributed (Ostrom 1990, quoted in Thomson et al. 2007), which has particular relevance towards open data. The common forum is especially useful in the case of conflict or opposing stakeholders, where harnessing differences creates the possibility of 'synergy' (Huxham et al. 2000; Thomson et al. 2007), but many collaborative efforts are managed in non-cooperative ways, such as through contract provisions or funding restrictions (Agranoff 2006).

Collaboration often unfolds in phases that have been described at length (Ansell and Gash 2008), and roughly follow a pattern of preparation, including setting ground rules, policy development which includes information gathering or fact-finding, followed by deliberation and negotiation, and finally decision-making and implementation (Booher 2004; Edelenbos 2005). The deliberative aspect of collaboration is often emphasized, and is described as "the identification and weighing of policy options, in a context of careful and respectful consideration of different values and viewpoints, with the aim of establishing public priorities and articulating a direction for public action" (Gollagher and Hartz-Karp 2013:2349). Negotiation is an inherently adjudicative and deliberative process, taking place among a set of stakeholders working together in a common forum (Ansell 2012). In Emerson et

al's (2012) integrative framework, the setting of ground rules in the opening phases results in 'principled engagement', encompassing the interaction of four basic process elements: discovery, definition, deliberation, and determination (Emerson et al. 2012:20). It is in the attention to process that lie collaboration's strengths, and for this reason, the first major challenge in collaborative governance is ensuring the commitment of all stakeholders to these processes (i.e. principled engagement) (Ansell 2012). The processes must be open and inclusive, the ground rules must be clear; the processes must be designed to be transparent (Ansell and Gash 2008).

Collaboration is often reliant on facilitative leadership to ensure commitment, through enforcing the process rules and activating the appropriate stakeholders (ibid). The care taken during this early interaction generates dynamics associated with stronger collaboration, including trust-building, joint fact-finding, frame alignment and overcoming knowledge asymmetries, the identification of common values and generating common institutions which contribute to overall shared motivation towards the collaborative project (Ansell and Gash 2008; Emerson et al. 2012) These internal dynamics deliver the capacity for joint action. The components of collaborative dynamics (principled engagement, shared motivation, and capacity for joint action) interact over time synergistically, and propel collaborative action (Emerson et al. 2012). Bartenberger and Grubmüller-Régent (2014) propose that there are especially three elements where collaborative governance can benefit from open government data: overcoming knowledge asymmetries, facilitating joint fact finding and enabling trust building (Bartenberger and Grubmüller-Régent 2014:41).

The ultimate goal of collaboration is to form a functional network of actors that are able to continue operating in a collaborative framework, to perpetuate the collaborative process as a cycle. While collaborative governance is perceived to help resolve disputes, its real value lies in building the collective capacity for subsequent collaborations, a platform based on trust and common institutions (Agranoff 2006; Linders 2011; Ansell 2012). Collaboration should be seen as an investment which pays for its intrinsic costs over time. However, this initial investment is considerable, in terms of time, money, and social energy, and which is not guaranteed to produce results (Agranoff 2006; Ansell 2012). Thomson et al. (2007) also discuss the tension that arises among collaborative participants, pulling them between the objectives of the collaboration and the objectives of the individual organizations represented. The greater the tension, the greater instability of the collaboration.

2.5.1 Conceptualisation

Collaboration as a mode of governance is capable of an equally broad and abstract definition, as 'a type of governance in which public and private actors work collectively in distinctive ways, using

particular processes, to establish laws and rules for the provision of public goods' (Ansell and Gash 2008:545). This entails the engagement of citizens, businesses, and government agencies in complex tasks or projects that aim to produce specific outputs (Veljkovic et al. 2014:279). Emerson et al. (2012) define collaborative governance as "The processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished" (Emerson 2012:2).

Collaboration is epitomized by decisions made through mutual consensus. Booher (2004) condenses a list of conditions for successful public policy consensus-building: 1. Inclusion of a full range of stakeholders 2. A task that is meaningful to the participants 3. Participants who established their own ground rules for behaviour, agenda setting, making decisions, and many other topics 4. A process that begins with mutual understanding of interests and avoids positional bargaining 5. A dialogue where all are heard, respected, and equally able to participate 6. A self-organizing process that is unconstrained by conveners in its time or content and that permits the status quo and all assumptions to be questioned 7. Information that is accessible and fully shared among participants 8. An understanding that consensus is reached only when all interests have been explored and every effort has been made to satisfy these concerns. This list of conditions complements Ansell and Gash's definition, and upon closer examination can be seen to reflect a number of the internal processes described above.

Collaboration in public administration may be actualized in three dimensions: horizontal procedures involving multiple stakeholders; transversal policies shared by multilevel institutions such as supranational, national, regional, and local governments; and circular subsidiarity, notably in the form of public– private–civic partnerships and "shared administration" (De Blasio and Selva 2016:230). However, more recent research has broadened the definition, for example to include community-initiated collaboration and 'multi-partner governance' (Ansell 2012; Emerson et al. 2012). 'Multi-partner governance,' can include partnerships among the state, the private sector, civil society, and the community, as well as joined-up government and hybrid arrangements such as public-private and private-social partnerships and co-management regimes (Emerson et al. 2012:3). For the research, we will be searching for examples of horizontal collaboration between stakeholders, which may or may not also include examples of circular subsidiarity. We do not foresee observing transversal collaboration of any kind as it lies outside the boundaries of the research question.

2.5.2 Collaborative Governance – Practical Ideal Type

Perhaps the most widespread of definitions of collaborative governance, Ansell and Gash define it as: "A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programmes or assets" (2008:544).

Ansell (2012) references Siriani (2009) for a set of "eight very general design principles for collaborative governance" which are listed below.

1) Citizens should produce public goods
2) Community assets should be mobilized
3) Expert knowledge should be shared
4) Citizens should deliberate together
5) Partnerships should be encouraged to be sustainable
6) Assets and governance networks should be strategically mobilized and deployed
7) Institutional cultures should be transformed to support community empowerment and civic problem solving
8) Mutual accountability among collaborative partners should be ensured.

Siriani (2009), quoted in Ansell (2012).

Considering this and the definitions from the preceding section, we condense the core components of the various definitions.

Collaborative Governance must be:

- **Sustainable partnerships between public agencies and non-state actors (including communities, stakeholders, and experts)**
- **Formal, deliberative, consensus-oriented environment**
    - **Possessing clear process rules, an inclusive environment based on open communication**
    - **Facilitated and administered by leadership**
    - **Mutual accountability among partners**
- **For the production or management of policy or public resources**

Performance measures of both the collaborative processes and productivity have been developed extensively (Gunton & Day 2003; Ansell 2012; Emerson et al. 2012; Emerson & Natbatchi 2015), but for this study we are assessing merely the *presence* of collaborative initiatives, and their links to open government data, as a necessary link to establish before assessing their efficacy. That being said, the literature conflates the presence of ideal processes with better collaborative performance, and we will be assessing the presence of these processes as indicative of an ideal collaborative governance regime, without regard to actual performance.

2.6 Assumptions

While government and open government data have so far been presented as monolithic, this glosses over the fact that governments are made of different specialized agencies or departments. These departments are often not entirely transparent to each other, let alone the public, while being primarily responsible for the data relating to their purpose. So, open government often has internal

effects as well as external, that the opening of government data may empower other departments, and may foster internal collaboration. This in particular is not relevant to our research question, but does point out the assumption that, by open data, we are referring to something more consistent across different subjects or departments than what may be seen in practice.

3. Research Design

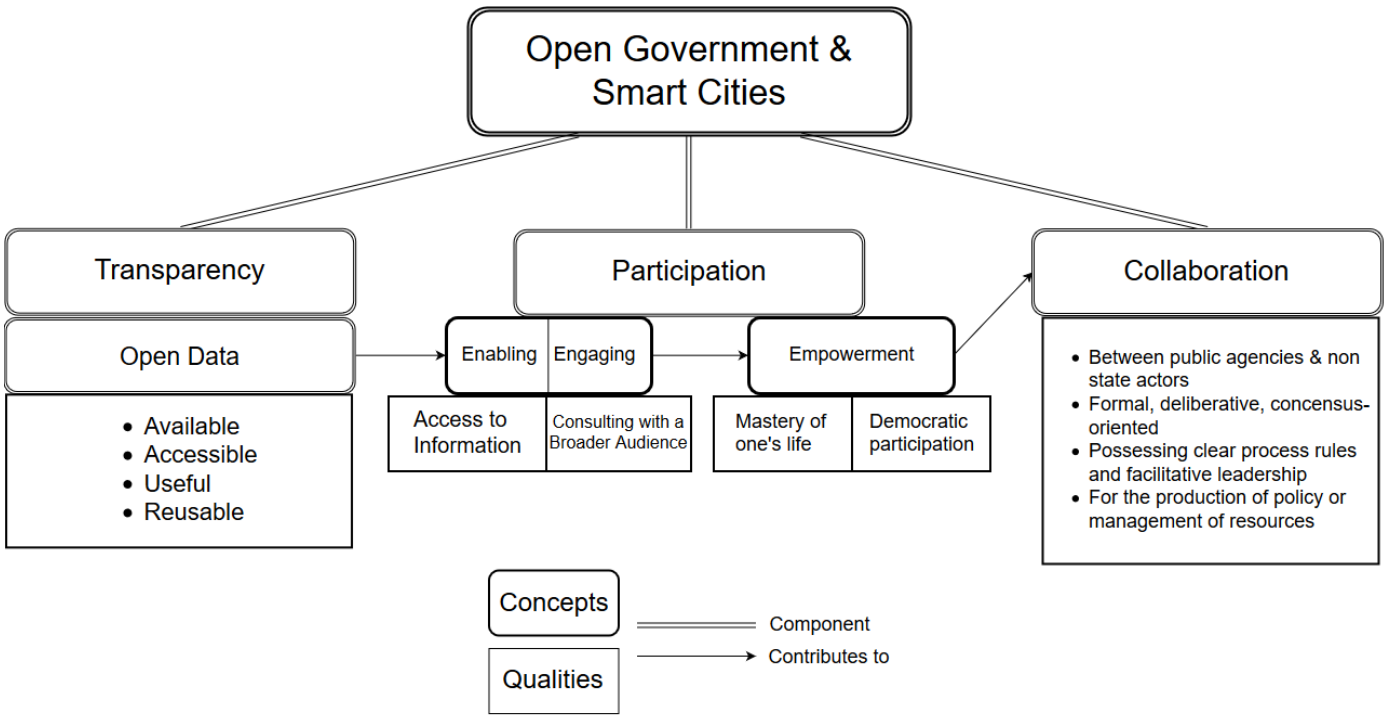
3.1 Introduction

In this chapter we shall do the work of translating the theoretical framework into a foundation for our research. To begin, the concepts outlined in the theoretical framework will be condensed into a conceptual model which will aid our thought processes going forward. It also supplies a structure to integrate the operationalization of these concepts, which shall follow. Then the strategy for conducting the research will be explained, justifying the unit of analysis, the methods, and the setting. Final attention will be paid to the validity and reliability of the study as designed.

3.2 Conceptual Model

Here the Theoretical Framework we have outlined is condensed into the conceptual model upon which the research will be based. The conceptual model is an attempt to construct a composite of the ideal types of the concepts that we have examined and the qualities that make them ideal.

Figure 3: Conceptual Model



Open Government and Smart Cities have been combined for their similarity in constitution for the purposes of the research as we have so far illustrated. Transparency, Participation, and Collaboration are its shared pillars. We have just described in the previous chapter how they are conceptually convoluted, to the point of being mutually reinforcing, but open data is thought to have a much more linear path. Transparency manifests through open data as long as open data strives to have the qualities of being available, accessible, useful, and reusable, which each have

their own necessary qualities as detailed in the Theoretical Framework. Participation is divided into token forms of participation, enabling and engaging, and empowered participation. Open data is capable of delivering greater access to information that constitutes the token form of enabling, through which empowerment is possible, including the form of democratic participation with the government. This form of participation may lead to collaborative governance, if the government meets their empowered citizens halfway, and enter into a collaborative environment defined by the characteristics listed underneath it. That open data is a resource that may empower citizens is taken more for granted than how empowerment leads to collaboration, and government needs to nurture this kind of empowerment if they hope to take advantage of the potential benefits of both open data. Likewise, they must nurture the collaborative environment if they intend to put these empowered citizens to good use.

3.3 Operationalisation

The operationalization of our research variables is fairly straightforward. As we have conceptualized open data and collaborative governance as delineating a certain ideal type in theory, the qualities of this ideal type can serve as individual points of interest.

3.3.1 Open Data

Our operationalization of open data expands upon the conceptual model generated by the previous chapter and combines Zuiderwijk and Janssen's (2014) framework for evaluating open data policy with Gurstein's (2011) model for effective data use.

- Accessible
    - Was policy concerning open data clear and accessible? Did policy ever change?
    - Was the internet available for those who might use open data? Is there a 'digital divide'? Do citizens know how to use this technology?
    - Was the data online? Was the data collected at a single online portal? Were there any times that the online portal was not accessible?
    - Were there other barriers to accessing the data e.g. political censorship or low bandwidth?
    - Were the computers and/or software available for accessing this data?
    - Was there any registration or application process to accessing data? Was the data free?
    - Did the data pertain directly to the subject matter that you were interested in?
    - Were the suppliers of data available for communication? Were inventories of available data supplied?
- Understandable (Content and Formatting)
    - Was the data available in the desired state e.g. raw/processed?
    - Does the data feel standardized, and follow standardized formats across datasets?
    - Did the datasets contain metadata? Did this metadata help to provide context to the data?
    - Was the volume of data appropriate for use on the level of technology a person could reasonably have access to?
    - Was expertise available for helping to understand the data?
- Reliable
    - Was the data collected at the source? Is the data aggregated in any way?
    - Does the data feel confidential?
    - Were there any noticeable errors or inconsistencies with the data? Was there an unreasonable possibility that the data might be misinterpreted?
    - Was the data up to date? Did the data cover a timespan reasonable for use in analysis?
    - Did technical support exist?
- Reusable

    - Did the data come with an open license? Did that include commercial reuse?
    - Does the government encourage reuse?
    - Are there conferences, workshops, competitions etc. to promote reuse?
- Were there target groups to open data?
- Are there strategies, programmes, guidelines, or recommendations that relate open data to specific policy measures, policy objectives?
- Are the means for advocacy and representation available to enable effective local interventions?

3.3.2 Empowerment

The questions related to empowerment stem naturally from the questions related to the usability and reusability of open data, extending into the nature of participation the respondent had with governance as a result of it.

- Do you believe open government data has a great amount of potential in the hands of citizens?
- Did you feel a greater sense of awareness of your environment through open data?
- Did you have goals inspired by open data?
- Would you have been able to accomplish your goals without the data obtained through open data programmes?
- Did you receive help in accessing, interpreting, or using the open data?
- Do you trust your government more as a result of open data?
- Did open data motivate you to participate in public life and local governance?
- Did your participation include making decisions or providing ideas?
- Are you interested to see what other opportunities could be provided by your government?

3.3.3 Collaboration

Our operationalization of collaboration is indebted to Thomson et al.'s (2007) investigation, though our research methods are ultimately different. The operationalization below proceeds from the definition used in our conceptual framework.

- Between public agencies and non-state actors (including communities, stakeholders, and experts)
    - Are relevant stakeholders included in the collaboration?
    - Are partner organisations transparent to each other, and to what degree?
    - Is there an easy way to leave the collaboration should an organisation desire?
- Formal, deliberative, consensus-oriented environment
    - Is there a formal agreement that spells out relationships between partner organisations?
    - Are there standard operating procedures to coordinate each other's activities?
    - Are partner organisations involved in all phases of the collaboration, such as problem definition, brainstorming, decision-making, implementation, and evaluation?
    - Is there an inclusive atmosphere to the collaboration? Does every opinion have the chance to be heard, and are all opinions taken seriously?
    - Is there a manager specifically for coordination?
    - Is there a steering committee specifically created for making decisions?
    - Is conflict resolved in the open? Is there an external authority to mediate conflict?
    - What is the level of consensus necessary to make a decision? Is it unanimous or some sort of majority?
- For the production or management of policy or public resources
    - Is there a mission statement to be fulfilled?
    - Are concessions made for future collaborations?

3.4 Research Strategy

The research phenomena (open data and collaborative governance) we are studying are dependent on and are the desired features of the context (an open government and a smart city) in which they are found. Thus it makes sense for the research to be performed as a case study within a suitable context (Baxter and Jack 2008). The boundaries of our case study are similarly straightforward – as the context is a city, the limits of that city forms our boundary. The research phenomena are not

limited to cities of course, and many cities attempt to distinguish and ascribe a form of identity to themselves, meaning there is enough variation among cities to limit our case-study context to just one city, to be referred to by other case-studies in other cities.

Superlative among the qualities of open government and smart cities is Bristol in the United Kingdom, and so was chosen as the setting for the research. The United Kingdom leads the world in terms of open government and open data.[6] De Blasio and Selva (2016) found e-services in the UK to be most prominent in policy documents, with transparency and access to information a top priority. Bristol is the largest city in the South West and one of England's eight "core cities." Despite being less than 1/10th of the population of London, the city of Bristol is ranked in the top 5 most innovative tech clusters in the UK.[7] The city is among the most technologically proactive in the world, having won the Smart Cities award given by the World Communications Awards in November 2016,[8] and the Smart City award at the GSMA Global Mobile Awards in 2018.[9] It was also the UK's first recipient of the European Green Capital award.[10] The city is also home to a number of groups that specialise in citizen outreach through technology, including the now worldwide Playable City programme.[11]

These smart city accolades were given primarily for the flagship project BristolisOpen,[12] a joint venture between the City Council and the University of Bristol, which aims to develop an extensive and cutting-edge smart city network in partnership with a number of actors in the public sphere such as the Knowle West Media Centre,[13] We The Curious,[14] the Watershed,[15] and Engine Shed.[16] The Bristol City Council is in the somewhat unique position of owning much of the infrastructure instrumental to the project.[17] Apart from this project it is also one of the three main 'lighthouses' for the European Union's REPLICATE project, the vision for which is, "to increase the quality of life for citizens across Europe by demonstrating the impact of innovative technologies used to co-create smart city services with citizens, and prove the optimal process for replicating successes within and across cities."[18] Pertaining to open data, Bristol launched its open data strategy in 2010, and shortly

[6] https://index.okfn.org/place/gb/ accessed 4/8/2018
[7] https://techspark.co/bristol-ranked-in-uks-top-5-most-innovative-tech-clusters/ accessed 17/9/2018
[8] http://www.bristolisopen.com/bristol-is-open-wins-smart-cities-award/ accessed 4/8/2018
[9] http://www.bristol.ac.uk/cabot/news/2018/smart-city-award.html accessed 4/8/2018
[10] https://www.bristol2015.co.uk/ accessed 7/8/2018
[11] https://www.playablecity.com/ accessed 14/4/2017
[12] https://www.bristolisopen.com/ accessed 7/8/2018
[13] https://kwmc.org.uk/ accessed 7/8/2018
[14] https://www.wethecurious.org/ accessed 7/8/2018
[15] https://www.watershed.co.uk/studio/ accessed 7/8/2018
[16] http://www.engine-shed.co.uk/ accessed 7/8/2018
[17] http://www.publicsectorexecutive.com/Public-Sector-News/bristol-the-booming-smart-city accessed 14/4/2017
[18] https://replicate-project.eu/about/ accessed 7/8/2018

thereafter began to publish open data. Its champion, Councillor Mark Wright, at the time claimed that there were "only two types of data in Bristol City Council: confidential data we can't share, and open data which will be made available."[19] Open data formed the centrepiece of the city's transparency code released in 2015.[20]

3.5 Methods

The civic use of open data is socially constructed (Schrock and Shaffer 2017), as it is the perception, interpretation, framing, experience of, and response to the research variables that will precipitate the translation of one phenomena in our conceptual framework into another. The logical unit of analysis for our study is the unit of society, a person involved with these phenomena and participating in their construction. Qualitative data will be collected that reflect the perspectives and subjective experiences of the research phenomena.

Qualitative data will be collected through active interviews as described by Holstein and Gubrium (2016, see also 1995), which follows from Lofland & Lofland's (1984; 1995) view that an interview is essentially a directed conversation. The active interview methodology accepts that, with all interviews, the interviewer is part of the conversation and complicit in the construction of responses and in the structure of the interview. The conversation is guided but not constrained by the research operationalization, free to illuminate the unique experiences of the respondent and expand their insights. Such a method principally aims to capture insights or perspectives that were not anticipated in the research design. Indeed, a reasonable attempt to comprehensively cover the operationalization would need much more time than could be fairly expected from the respondent. The variety of perspectives gathered in the research will collectively construct an overall narrative of the social and cultural reception of open data and the kind of changes it has affected through the aggregated lived experiences of the respondents. This is known as the constructivist paradigm (Seale 1999).

The interviews will ask research subjects of their knowledge of open data, transparency, and collaborative governance, of their awareness of how these programmes have been put into practice locally, and of their subjective impressions on how they interact or the dynamics that are generated from their interaction. The research question hinges on empowerment, and the interviews serve to construct narratives in which the level of empowerment may be analysed, through whether or not

[19] https://www.local.gov.uk/bristol-city-council-bringing-open-data-life
[20] https://www.gov.uk/government/publications/local-government-transparency-code-2015 accessed 26/9/2018

any such empowerment is perceived or utilized. As the perception of empowerment is integral to empowerment itself, the subjective nature of an interview assists in its identification.

Respondents will be sought out on a tiered basis of a) having experience with data, b) having experience with open data and the open data portal, c) having used this open data for a public purpose, and d) having worked with a public body or representative for this purpose. What is hereafter referred to as open data projects is a broad definition, from projects that were built as essentially a proof of open data's usefulness, to projects that made use of data that was already open, to projects that collected data with the intention of making it open after the project's conclusion. In most cases, the projects encountered were a mix of all these. Naturally, respondents who fulfil all the above criteria will have more relevance to this thesis, but other interviews with respondents on lower tiers may contribute further insight.

Interview respondents were recruited through attending events oriented towards data or the data community in Bristol, through emails to the organizations involved, or were volunteered by other respondents. Ten in-depth interviews were conducted with a variety of respondents representing the Bristol City Council, Bristol University, local organisations involved with data programmes or projects, data industry professionals, and open data advocates and enthusiasts (see Appendix 1).

Coding took place after the interviews were collected through a system of content analysis. An initial set of codes were lifted from operative words in the sentences of the responses, what is known as 'in vivo' coding (Miles, Huberman, and Saldana 2014). At the same time, a numerical code was assigned to each sentence for the sake of organization, so that its context was easily retraceable and never lost. Other codes were generated in a descriptive or evaluative method (ibid). A second pass was then made that allowed the codes to be collated among their common themes. These were then referenced against the conceptual framework.

3.6 Validity and Reliability

3.6.1 Internal Validity

Validity is traditionally a quantitative construct and has been somewhat bruised in the move to qualitative data, but may be interpreted as the extent to which an account accurately represents the social phenomena to which it refers (Creswell and Miller 2000; Hammersley 1992:67, quoted in Silverman 2008:258). There are some specific issues of validity when dealing with a case study and with interviews.

It must be acknowledged that in all cases with interviews, the responses may be slanted by the communications skills of the respondent, as well as the fact that the response will be constructed

immediately in the circumstantial environment of the interview, which can alter the respondent's disposition and their answers. For instance, a busy café can be distracting, or a faceless Skype call alienating, and these circumstances cannot be accounted for and standardized. Political and social pressures, including those relating to professional position, may also influence the responses especially when the research is related to these areas; interviewees have their own vested interests in their professional work and social position, and subsequently are presenting a public-facing identity related specifically to the context of the interview.

The interviews were denaturalized in the process of transcription, which is to say that they were edited for basic grammatical fidelity and disambiguation (Oliver et al. 2005). Some small portions were redacted at the request of the interviewee in only a few cases, and after the interviews were transcribed they were offered to respondents for any further edits they wished to make, though none were made. Other than these clarifications, the interviews are transcribed and presented verbatim. This was done to ensure that our data was as valid as it was substantive. And as we shall see in the Findings and Analysis, our data is presented in its complete or whole form as far as possible, to prevent suspicions of bias or being selective.

Within our Findings we present a dense intertextuality as a method of mutual support and verification of viewpoints, what could be classified as triangulation of sources (Seale 1999; Creswell 2013). As is somewhat of a risk regarding qualitative research, it quickly became clear in analysis that the research data deviated from the conceptual model. But as I hope to elucidate, when taken together the interviews yielded a densely interconnected discourse, which suggests that the respondents perceptions of the research subjects are similar, and that a lack of dissonance suggests an altogether more truthful construction of reality, allowing for the elevation of the analysis to a level of objectivity. We have attempted to thread these insights together to reconstruct the ongoing narrative of open data.

In our Analysis, we are comparing our Findings to our Theoretical Framework in a search for disconfirming evidence, as case studies are better characterized by a falsification of previous theories and models (Flyvbjerg 2006:19; Creswell 2013). Some of these theories will also be validated. This accomplishes the task of applying the Conceptual Model to the case study, and assessing whether and which parts fit, which do not, which parts are contradicted and what new elements there are to consider.

3.6.2 External Validity

External validity can also be called generalisability or applicability, a measure of the extent to which research results can be applied to another setting in the form of assumptions (White 2011:234). The

results of this research as with all case studies are completely dependent on the context. Bristol was chosen for its status as a smart city, in a country that is consistently top-ranked among open governments. Other settings would most likely have had differing levels of openness and smartness, as abstract as those qualities may be, and differing levels of more tangible qualities such as size, governance, and industrial focus. But it would be remiss to say that the results can only be relevant to Bristol alone. In the words of Flyvbjerg (2006:9), if this thesis could be proved false in the favourable case, then it would most likely be false for intermediate cases.

Furthermore, Bristol as a context has more in common with other contexts than may have been previously true, thanks to the forces of globalization and the fact that the research subjects, our interviewees, are products of a globalized world. The Open Government Partnership has 70 nations as participants, and the Smart City awards given to Bristol had candidates worldwide. Likewise, the people involved in bringing these programmes to life are aware of these global trends and are in constant communication (through the information technology that has not only enabled our research concepts but globalization itself). In a changing world, the results of this research represent another attempt at surveying the landscape, not an attempt to draw the entire map. What is certain is that there are other settings with comparable similarity to Bristol that could form a different context for exploring the research variables we are exploring here which, as they are theoretically based, can be easily transported to these different contexts. The results of this study can also be of use even if they are not generalisable, as they can be learned from to inspire and guide scientific innovation (ibid:10)

3.6.3 Reliability

Peräkylä (2016) defines reliability as assuring the accuracy and inclusiveness of research data. Miles, Huberman, and Saldana (2014) provide a useful checklist for reliability which we have referred and adhered to as far as is possible. We will explain in greater detail below.

Like this checklist, we have sought to ensure reliability in this study by finding or composing lists for different reasons. For example, both of the Tables thus far provided attempt to be comprehensive in establishing our theoretical background. The practical ideal types we have developed provide a list of definitive qualities which may be assessed in any context. The operationalization of these concepts provides a list of questions to guide the research process. By breaking down the research problems into smaller, more precise questions, our workflow is guided and a greater measure of consistency maintained. This was also applied in our Findings, as our data was broken down into components that could be compared in more precise detail.

Apart from this, the backgrounds of our research subjects collectively aims to provide a full spectrum of perspectives, and the interview methods remain consistent as to supply “meaningful parallelism” across sources (ibid). So far we have explained the procedure for our study at every turn and will continue to do so. Our methods for data collection and analysis have been identified and explicated as following the constructivist paradigm. Finally, our data, as interview transcripts, have been retained and will be available for reanalysis, as well as copies that illustrate the coding process.

White asserts that reliability rests on the assumption of a single, observable, and objective reality, and suggests that reliability is hard to maintain in qualitative research (White 2011:235). When performing a case study with such specific context rules, that context can be said to be a microcosm, a separate reality with a distorted value of what is objective. But by constructing this microcosm we are able to magnify the details that differ and stray from the archetype, the details that we are investigating, and so by thoroughly structuring and documenting the research process do we hope to provide reliability to the findings, keeping the magnified microcosm in focus.

4. Findings

4.1 Introduction

In this chapter our research findings will be compiled and presented, having already been gathered, transcribed, and coded. Most importantly the findings will be collated (to the best of their ability to fit) along the lines of the conceptual framework, affording a familiar structure reproduced below for the ease of the reader.

4.2 Early Days

Perhaps the most broad impression found among the respondents was recognition of the potential for open data, but, moreover, that this potential was currently underutilized, and that open data was still in its 'early days.' Respondents could not say for sure whether there had been many initiatives that 'translated data into something that yields a tangible benefit to the communities,' that the conventional plan of 'crowdsourcing of useful insights' had been 'very limited'.

Despite launching several years ago, the open data programme has had considerable growing pains. As was learned from respondents in the Council, there has been 'quite a quick turnaround in staff,' and because of this 'some things have slipped through the cracks.' The online platform is currently being redesigned, with the aim of making better use of new infrastructure that is being implemented as part of the major smart city project currently underway, to which we will return in the next section. The Council admitted that 'we've done no publicity on this yet' as these priorities are addressed, and is only now looking towards 'pushing it out there and raising awareness' over the next two years. But in the words of one respondent leading an open data project, despite the infrastructure being 'not properly, fully developed' it's a 'continued pushing forward' for best practices and policy. From an outside perspective, a respondent felt that 'even though nothing is happening with it right now, the practice of putting data we have available out there is a good one,' though another respondent complained generally that, considering the enormous amount of data being generated in the information age, the amount of data that was open data was 'almost trivial.'

While the open data programme did have its problems at launch, this is not the only reason for its lacklustre reception. It seems that the response of the public towards open data was greatly overestimated, mainly for issues of accessibility that will be elaborated in a later section. But respondents now recognise that, for some, an explanation of data *as a concept* was still needed. More than once did respondents recall finding themselves asking the basic question, "What is data?", when relating to their audience, let alone exploring its potential uses as a resource. Respondents also reported that attitudes towards data were very much formed in relation to how data has appeared in debates on privacy in public discourse. In the words of one respondent, people 'equate data with personal data,' and while there exists 'strict information governance' around

anything that could be personal data, it is somewhat contrasted by a 'real absence of policy' around sharing non-personal data and metadata which directly hindered the respondents' working with that data. Thoughts about privacy obviously stand in greatest contrast to the philosophy of open data, and in coincidence with the recent GDPR (General Data Protection Regulation), the general approach to data has been risk-averse. This has presented a 'risky situation' for open data and could be blamed in part for its limited success, but also presents a corresponding 'enormous opportunity' for progress given that the distinction between personal and non-personal data is recognized.

Several respondents who had worked on a project together thought that, despite the data collected being anonymous, it should not be open data without the specific consent of their respondents, which they had neglected to ask for. For the most part where privacy concerns were mentioned, many of the respondents spoke of data being 'anonymized,' removing specific identifying information or 'adding in those levels of privacy' as separate processes which are performed outside of the process of data collection. Some respondents even saw this process as a viable foundation for an independent social enterprise, what they referred to as a 'data consultancy.' While one respondent felt that some people's opinions as they related to privacy were all but fixed, several respondents, as proponents of open data, did note that attempts to define and frame data to others in accessible terms were warmly received, and that people could be reasonable about privacy. For instance, a respondent recalled asking project participants to share information about their houses, and the participants generally agreed 'as long as it wasn't plotted exactly to their house.'

4.3 Open Government and Smart Cities

The respondents themselves, who have greater experience with open data, were quick to frame it as a 'common resource' or as a 'commons' much like other public assets, and evoked the commons' past importance to civil society. In particular, more than once did respondents refer to open data using a public park as a metaphor. The task now was to recognize 'particularly a digital and data commons.' But like the public parks in the area however, the open data programme has suffered as a result of 'huge budget cuts' according to one respondent working within the Council, which was also noticed by several of the other respondents as citizens of the city. The Knowle West Media Centre, a community organization that is a main partner with the Council for open data projects described 'going for funding here, there, and everywhere' for their projects, which included 'arts council funding,' as well as from the local government, trusts, foundations, and competitions.

The overall approach of local governance was described by another respondent as traditionally following a more top-down discourse of 'community management'. But the city, 'because it cannot afford to be [a service deliverer] anymore,' is endeavouring to shift from being a service deliverer to

being what a councilmember described as a 'service enabler.' A service-enabler model for the local government involves,

> *"getting people, whether they be already existing community groups, or setting up new community groups, citizens, charities, organizations already out there to take responsibility for some of the stuff."*

Insofar as this model has so far manifested in the eyes of respondents, it involves providing funding for projects and the creation of services, as well as providing the platform for participation and engagement; a service enabler role employs not only traditional resources but utilizes the legitimacy of the government as a sponsor for its partners. The Council did also sponsor and provide the physical space for events related to open data, but some respondents, who were recruited at one of these events, 'could say with certainty that we have not heard of many.' Perhaps these events stand to benefit from the Council's plan to raise awareness.

A representative of the Council made clear that open data is a fundamental part of the strategy of the mayor, who was recently elected:

> *'his whole agenda is around communities, inclusion, transparency, is what his key themes are around. This is one of the ways that we're doing that is through open data.'*

While the Council maintains an open data portal, hosting a large number of datasets under a variety of data licenses, they 'do not have an open data policy.' Respondents responsible for overseeing aspects of the open data programme had lamentations at the reluctance of departments to release their data as open, though the reason for this reluctance is unclear. People simply 'like to hold onto their data.' Outside the Council, another respondent described developing an information sharing network as 'a quite challenging process just getting these different organizations to share.' These situations create a familiar phenomenon referred to as information silos. The current objective in the Council's open data strategy, raising awareness, is combined with the imperative to break down these information silos and is focused as much inward as outward:

> *"…what we're trying to do is work at a senior level to raise awareness and then get that as a directive across the whole organization of, 'you have to look at what data you've got, and you've got to see whether it can be made open.' So looking to see what data is within the organization firstly and then also externally working with different organizations, pulling data out that they have around the city, and the Council can then use to help inform policy or all that kind of stuff"*

Likewise, it was the organisations such as the Knowle West Media Centre that were tasked with developing a methodology or a framework for the open data projects that they led. Looking at 'how are people going to get involved in every step of the way in terms of a commons process of

decisions,' and incorporating it into questions of data governance including 'who is going to own this, what's the resource for' and 'the correct data agreement, data licensing, the right aggregation, anonymization, etc.' This framework was called 'The Bristol Approach to Citizen Sensing,' and will be elaborated in greater detail in the section on collaboration.

The Council's position was such that open data, if and when it is created, is intended to be a resource for 'economic development,' and desired for their open data to be 'fully open data that everyone can use, and even use to make commercial products and services from,' so that this aim would not be hindered in any way. But the idea of using open data for commercial purposes was brought up with very different perspectives by the respondents, which illuminated conflicting forces at work. A few respondents use or had used open data as part of their livelihoods. But particularly the Knowle West Media Centre, whose work is charitable, were sensitive to 'who is financially benefitting from our datasets,' and rejected the possibility of working with a business to commercialize the ideas developed in their projects, saying, 'that's not particularly viable for our approach.'

While the local government wishes for their data to be fully open without any restrictions, one respondent expressed great concern at equating open data strictly with the definition that Council advocates, which is supplied by the Open Data Institute. While the respondent felt that 'open data is wonderful and essential if economic growth is the goal,' their argument was that the fully open license would lead directly to 'enormous commercial sensitivities in sharing data constructs.' This respondent's view was that the confusing landscape that these licenses altogether present deter participants from using or contributing to open data, and was echoed in the experiences of other respondents. The respondent pointed out that the open data portal does host datasets with other licenses, meaning that to advocate for just one type of license seemed contradictory.

In Bristol, open data was conceived more of a smart city measure than an extension of open government. One respondent stated that open data formed an infrastructure that 'will eventually lead a smart city to thrive,' and went so far as to claim that you cannot have a smart city without open data, that both constitute an 'access to information without having to be on the ground.'

> *"I don't think you can have a smart city … without the open data aspect because all smart stuff, in this context, builds on huge amounts of data. So, you need to have that in place first, before you do anything else."*

The smart city project, Bristol is Open, that is co-owned by the Council had, according to respondents in the Council, recently secured funding to 'get super-fast, high-speed fibre connectivity down to Knowle West Media Centre so that they can use that as part of their Citizen Sensing

projects.' A respondent from the Knowle West Media Centre noted these aspects of smart cities, and placed the bottom-up approach that their Citizen Sensing methodology was developing in direct counterpoint.

> *'…as you probably know a lot of smart city initiatives start with the technology and they start with a kind of top down approach…we were supported by the Bristol City Council to come up with a methodology or a framework which actually starts with people and issues and looks at an approach which is driven by notions of the commons.'*

Though another respondent felt that 'smart city' could just be another buzzword with an 'emphasis on presentation and not much on institutional change', the claims from the Knowle West Media Centre and the responses within the Council presented here, particularly regarding the 'service enabler model,' seem to indicate that institutional change is occurring.

4.4 Transparency

One respondent's assertion that 'there's data here which is meaningful to the users of the data, and it's only become meaningful to the users of that data because they had a means of accessing it' could be seen as the primary mantra of open data.

The respondents found a natural association between transparency and open data, as a respondent inside the City Council affirmed that,

> *'one of [the Mayor's] key aims was to build more transparency into the Council, and to be more accountable to the public, for the public to have of an understanding of what we do as an organization as well. So, he's really keen on pushing the open data programme because its helps meet that aim.'*

As suggested above, open data not only provides transparency but also by extension helps fulfil a measure of accountability. The respondent in the Council would go on to say 'as an organization we're paid for by the citizens of the city so we're accountable to them to deliver the services that they pay for, so we need to be fully transparent.' Other transparency measures also provide avenues for engagement, such as a steering committee composed of citizens that was being set up to work with the Council to 'indirectly influence policy.' Another respondent that was engaged with authorities on the basis of trying to encourage the expansion of a particular open dataset thought of their work not as influencing policy but 'pushing the transparency agenda a bit further'.

4.4.1 Availability

Several respondents affirmed that open data should be administered by the Council, saying that 'if it's going to be open, for ease of usage [sic] it should be quite centralized, all in one place,' and implying that the Council was the logical locus for centralization. However, some respondents

reported trouble with the online portals and API's used to obtain open data, was prohibitively throttled,

> *'if you want anything that's usable you quickly go past your limit, unless you've got a long time to do it'*

As the API and online portal have also been changed several times since release, 'over time all the connections to the open data were all breaking,' leading to the abandonment of some previously stable open data projects. Change could of course mean that performance has improved, but the minds of the respondents were already made up,

> *'I think the open data Council website kind of had its golden age where it had a lot of money put into it a while ago, and now it's not so well-maintained I guess.'*

The Council recognizes that, 'the data community have been really eager to use this, and have been possibly quite frustrated with the way that things are going,' but remained hopeful that the programme plan in place 'will make them a bit happier in the next few weeks.' A respondent working in the Council also reported that,

> *'we get requests for data all the time, data that we don't have, data that needs updating, cleaning, all that kind of stuff.'*

This is perhaps encouraging, as it shows that there is enthusiasm from some circles of the public that may coax the open data programme forward. But it seems the interface between citizens and the Council regarding open data is where improvement is most crucial, where there is currently little transparency or engagement. In the words of two respondents:

> *'I don't know if there's any particularly easy way to inform the Council about what you need.'*

> *'I've not in my work seen a good example of an ability for someone to request or recommend that a dataset be made open, and then the appropriate people to review that in timely fashion and for it to be made public.'*

Regarding the second quote in particular, the respondent was also referring to a personal experience where he was frustrated by the lack of institutions towards making data open: 'making that request was part of me trying to empower myself.' The respondent clearly implies that while the interface between citizens and the local government remains obfuscated, self-empowerment is limited. By extension, we may presume that opportunities for collaboration are forestalled.

As one of these respondents reasoned, 'the public can't ask for certain data to be made open if they don't know it exists.' To combat this problem and to streamline issues of availability, the respondent advocated for an "information asset register, which is a term that is used within many public-sector bodies as a product that describes the information assets that they hold." This idea essentially

intends to make open data transparent in itself, and concurs with a 'configuration management' effort that a respondent in the Council said was currently underway inside the Council to take note of what datasets different departments possessed, because in their own words, 'we don't actually know what we own ourselves because it's such a vast organization.'

4.4.2 Accessibility

A secondary mantra of open data is 'available does not necessarily mean accessible'. This nuance, often underestimated, has had far reaching implications for the open data landscape, as the rest of this analysis will show. The basic difference was described by one respondent,

> 'I think a lot of councils or organizations think that making their data open would be great, but it doesn't solve anything or anyone knows how to find it or read it or do anything with it.'

One respondent, a data scientist, pointed out that '80% of my time is cleaning those datasets and making them suitable for analysis,' while another respondent described the data given at a hackathon as a 'hot mess.' For some, this intrinsic aspect of data threatens to collapse the open data programme from within. One respondent (outside the Council) felt that, "No Council is going to release all of its digital data as completely open…the staff costs would be too high to clean and quality assure." But some respondents felt that the challenge was not as insurmountable as others suggested. They recalled incidents where 'some readings were incomplete, or the recording station was broken that day,' leading to situations where 'there's gaps in [the Council data] and there's bits that's mislabelled and stuff.' But these complaints were comparatively minor, as these cleaning processes are to some extent standard among data analysis; 'it would take some cleaning, but I thought it was pretty good really.' As one respondent declared,

> *'yes, there are concerns over data validity, but it's as good as we've got, and better than what other people have got.'*

In order to rise to the challenge that data analysis presents, respondents concurred that 'often very quickly you need some kind of programming experience to shape the data into some kind of form that you can start analysing.' Respondents concurred that 'digital landscaping is not very easy for people that don't work in tech to think about' and more generally that 'for the vast majority of people that's beyond their skill-set.' But another respondent thought that though it requires 'quite a lot of work to get going with … I think that's how most things are.' Other respondents did suggest that 'it's always useful to have some data but to interpret it with a sceptical, to take it with a grain of salt.'

Many respondents thought that skills training would need to be provided if open data were to be successful, expressing scepticism that the average person has the skills to work with open data. One

respondent that worked in this area felt that there was ‘a lot of education to be done,’ and another respondent felt that ‘if you’re going to make data open then you need to provide access to education on how to use it.’ Opening data would otherwise be ‘vain, if they’re not preparing the end users.’ Transparency alone was not seen to be enough for open data to be successful, as one respondent felt that if ‘they don’t understand it, then how are they going to be empowered to be part of making the change?’ Several respondents were in fact associated with a position at the university whose purpose it was ‘to give researchers access to more advanced data science tools than they would have access to,’ showing that the issue of accessibility does have considerable scale.

In lieu of proper training, respondents talked about the use of tools to ‘lower the bar for participating.’

> ‘Because the tools are so easy to use and accessible to people with a little bit of knowledge, then it’s easy to experiment with things.’

Such tools perform pre-programmed tasks on a dataset, which is perhaps sufficient for the user. While many of the tools described by respondents had a specific and therefore limited purpose, Google Maps was cited more than once as an example of a ‘just a really good tool’ that is broadly easy to use while incorporating lots of data. But tools do not yet exist for the most important tasks of working with data, such as cleaning and preparing for analysis. As one respondent phrased it, ‘simple mechanisms for people to do the kind of technical data cleaning work, that is very, very, very rare.’ But another respondent expressed vague hopes that ‘with the advancement of AI’ the challenges of improving data quality and accessibility could be overcome: ‘If you could mine data based on their metadata without too much human intervention you could take a lot of that cost away.”

Lastly, respondents pointed out that the ability to work with data is not only dependent on the technical skills of the user but on more basic things, ‘it requires a certain amount of free time and a certain amount of material security.’ The necessity of time was often used as a qualifying clause when people spoke of engaging with open data: ‘there needs to be more than for the data to be available, you need a lot of time,’ ‘if you’ve got time on your hands, you can do some clever combining of information,’ and ‘…those who have the extra time on their hands to actually do something like this.’ But that is somewhat the point of making data open, ‘to be there for people to take advantage when the time is there.’

4.4.3 Usefulness

While tools and training are not yet widespread (as it is ‘early days’), the usefulness of open data suffers. As one respondent mused, ‘it seems like all the focus is on collecting data, and there hasn’t

been much thought about how to use it.' And even when data is accessible, this was distinct from usefulness, 'the open data, the Council data, would be pretty accessible. I don't think it's useful for a layperson.' Even the processes of making data more accessible comes at an expense; one respondent shared the anecdote, 'they've tried to make it anonymized, maybe at the detriment of making it useful.' But respondents concurred that the usefulness of data is most seriously hampered by the fact that much of the data was collected for a specific purpose, often medical or academic.

> 'Although the data are quite often of good quality it's often not very accessible because of issues with the metadata, or not necessarily issues but that the data was collected for a very, very specific purpose.'

Put more simply, there were concerns that 'whatever your particular thing was might not have been measured.' And because of the data's remarkable specificity, e.g. 'you're dealing with inspection data that hasn't been collected for research purposes,' it does not have a wide area of overlap where it could be integrated with other datasets and become useful. One respondent recounted the lessons of his open data project, 'the main takeaway was the fact that we were trying to do something that the data wasn't designed for.' This presents a more fundamental problem.

The usefulness and success of open data is reliant on its integration with other datasets; as a respondent from the Knowle West Media Centre described their hack-days, 'we would look at existing datasets … try and integrate and intersect different datasets.' One respondent reported that a frequent lament among data users was the wish to combine their data with other data, in order to 'bring it to life.' The City Council simultaneously recognized that a lack of integration preserves the symptoms of information siloes: 'the Council does a lot of different things and people working in their own departments and actually any data cross-cutting, data sharing does happen but not as much as it could do,' while encouraging the integration of open data: 'one of the key things that we want people to with the data is to merge with different datasets and getting new insight.' Other data professionals also described their work in just this manner.

Some respondents also reflected that some data would be hard to integrate, 'and the main problem there is having people cover it in the same format and things,' even though the measurements may be of nearly the same thing. They and other respondents proposed speculative solutions involving 'Universal ID's' or a 'protocol,' a set of standards to which all data collection would conform, arguing, 'it's in the interest of the country, for it all to be synchronized.' This line of thought then expanded to consider the current model, where 'cities are competing against each other, to be smarter than each other and to get funding for that,' could be superseded by even a basic level of collaboration, 'as a country, make a commitment to this on a very low level and you'll be able to develop some kind of framework for this.' Elsewhere as a case in point, a respondent reported the sentiment that the

United Kingdom's datasets relating to traffic incidents, collected as a part of police procedure and collated at the national level, were the 'envy of the world.'

4.5 Engagement and Empowerment

'The reason it would be cool,' said one respondent of open data, 'would be if people could check and see if something was a problem and then could lobby their council about stuff that's important to them.' This is more or less how open data was envisioned to work but is not exactly how it has manifested in practice, primarily for issues of accessibility that we have discussed. The initiative of engagement with open data continues to rest on its proponents and disseminators, and not with the local government. As a member of the Council said, 'we haven't done any engagement with external organizations yet, or citizens really,' as their priorities have laid elsewhere. But the Council has been known to engage its citizens before. Several respondents recalled attending an event that they referred to as 'that big march about the local funding' which had been 'endorsed by the mayor,' and held in response to austerity-imposed budget cuts.

Numerous respondents related to searching for a way 'to help people engage with these important facts through presenting something that's more personable than numbers and dry charts,' having recognized something to the effect of, '…if you put data on a spreadsheet and you give it to someone it's just so dry isn't it, it's not exciting, it doesn't inspire people to make changes in their community.' To make open data more engaging for those who do not find it accessible, many of the respondents considered producing visualizations of data to be a main aspect of working with it. As one respondent said of visualization,

> *"…if you give them a visualization of it, it brings it to life, it's colourful, you can show it to children, and they can be more interested in it because you can actually make sense of it when its visualized."*

Expressed in a different way, visualizations mean to:

> *'have, where possible, representational correspondence to engage people with lower levels of traditional text-based literacy and numeracy, but have visual literacy, that can lead towards a critical literacy if we provide the right tools.'*

One respondent described assisting on a project where 'the analysis is done by other researchers but then want to disseminate the results visually,' while another respondent described his data modelling project as 'the ultimate visual comparison tool.' But visualization was not so strictly defined by the respondents, and outside of more conventional visualizations such as graphs or 'representational correspondence', included 'creating stories, creating documentation, making audio, creating films, creative approaches to both the level of engagement and awareness raising and codesign.'

A diversity of visualization and engagement serves as the basis for the Citizen Sensing project that is the flagship open data project in Bristol, led by the Knowle West Media Centre, the organization tasked with developing the methodology for future projects. For the Citizen Sensing project, engagement involved incorporating artists who have 'brilliant skills at translating or communicating with wide range of people in lots of different languages.' As another respondent working with open data had learned, people working with data are often 'so entrenched in what they're doing they don't see the creative potential uses outside what it was designed for.' They recognized that 'the more we make this a shared thing' brought success both in terms of engagement and practical solutions, for. Altogether, the 'citizen-sensing' framework endeavoured towards:

> *"setting up the right situations to bring together … a mix of people with different skills to be a part of creating the solution. Not just about understanding the problem better but also about working together."*

A respondent from the organization involved with the project recounted that 'once you start to engage people around the problems, issues, things they care about, then actually people do care,' and even that 'the problem becomes bigger than the individuals' worry about privacy.' In short, a problem-orientation for open data projects leverages peoples' real-world issues to foster engagement – 'using that whole citizen-sensing approach to get people interested generally in data.'

Engagement on the face of solving a problem was one thing, but when asked what open data needed to be successful, one respondent was adamant about the need for more and better incentives: 'money incentives is one thing, competitions, prestige. But to see their ideas actually implemented. Because what's the point in doing all these things.' This was in a way corroborated by another respondent's memory of a data challenge where 'some insights were generated but they lacked the resources and priority to gain traction,' and later said that,

> *'I think there's a lot of good ideas but I'm not sure if there's been many initiatives that have been very successful already, to translate data into something that yields a tangible benefit to the communities.'*

4.6 Collaboration

Collaborative governance as defined in the theoretical framework was not seen in its entirety, simply due to the lack of ongoing projects in these 'early days'. Collaborations have so far more frequently took the form of contracts, funding commitments, or hackday sponsorships. And as has been discussed, the methodological framework for collaborations on the basis of open data is still in development, albeit simultaneously laying the ground work for future engagements. Respondents in the Council said the Citizen Sensing project was problem-oriented, but also strived to 'solve it communally so it helps with inclusion, social capital, things like that.'

'they, as an organisation, went out across the city and educated different organisations across the city, not just in Knowle West, to understand the concept of citizen sensing so then they can roll it out with the citizens that they work with as existing groups.'

As citizen sensing is driven by 'notions of the commons,' the project aims to involve citizens 'every step of the way in terms of commons process of decisions', and to still feel included in the face of obstacles such as technical jargon.

These internal processes are collaborative, but the arrangement qualifies as governance only insofar as there is 'a good open dialogue with the local government,' and they're 'working quite closely with the properties team and the housing development team.' The organization serves as a liaison between the citizen and the Council, partly by the design of the new service-enabler model. Separate from this project was the announcement from respondents in the Council of the formation of a steering group, described as 'people outside, normal people outside of the Council,' for the purpose of 'trying to get everybody onboard so we can move the open data programme forward.' But so far, as another respondent reported, 'this crowdsourcing of useful insights that might lead to policy change in my firsthand experience has been very limited.'

Another respondent who worked with open data provided by the (national) government said that there was no other collaboration besides, but also said 'where we do seek to cooperate is with civil society, non-governmental organizations, charities will come to us.' As has been discussed before, the low accessibility of open data also means that anyone trying to understand data would benefit 'to have someone who has expert knowledge in the area and to interpret it quickly.' On the other hand, as another respondent articulated, there are some who recognize that 'data gets used for advocacy,' and fulfil the role of 'helping make data into evidence.' These experts who have devoted themselves to being an intermediary between the data and the citizen, describe their motivation as, 'when [the government] said they were going to make [data] available we decided this was our opportunity to do something public facing with it.' Another respondent provided a more technical definition of the role of intermediaries as

"…some kind of more formal recommendation group that bridges within (public sector organisations), and without (external communities) they have a direct line of some sort of functional, technical, and information governance and steering mechanisms…they make an ecosystem that allows for more of [data advocacy]."

Intermediaries serve to bridge the gap and guide engagement in other ways than described in the Citizen Sensing program. As what aspects of the data are the most relevant to its audience is highly subjective, a respondent who worked in the role of an intermediary professionally described his

work as ‘sitting in the middle’ and to ‘broker’ the right information as well as performing the necessary work to prepare it. Essentially, they collaborate to maximise the amount of empowerment a dataset can deliver to their collaborator. The respondent recalled one anecdote of assisting a policy advocacy group and was told, “Your report was of fundamental importance towards being able to move that policy forwards.” An intermediary can become so specialized in some regards that they displace the traditional public bodies responsible for disseminating information, as the respondent reported that, ‘local authorities, despite the fact that they’ve got access to the data from arrangements they have in place with the local police force, the easiest way for them to get the data is just to go on [our service].’ This may signal towards a future where intermediaries don’t just bridge the gap but fill it in completely.

5. Analysis

Using the body of material that we have gained in our Findings chapter, this chapter will compare the findings against the conceptual model that was generated from our theoretical framework. We will be looking for discrepancies and unanticipated elements that introduce new horizons to our theoretical landscape, as well as encouraging similarities that might suggest connections between the theoretical body of these concepts and their practical manifestations – that the previous recommendations of scientists are being heard. Furthermore, where previous empirical research has been referenced by this thesis, we will attempt to relate our findings to it in order to suggest, only rudimentarily, if their conclusions are reliable.

5.1 Open Government and Smart Cities

The concept of open government as dependent on transparency, participation, and collaboration is very much alive in Bristol, including accountability in its aims as well. Citizens are appealing for access to information and ongoing communication is advancing with the development of a new steering committee. However, inside the administration a culture of transparency has yet to be realized. The government is keen to engage and include community organisations, neighbourhood forums, and citizens on the basis of projects. The transition of the government to a service-enabler model may enhance the qualities of open government by necessity, as they are forced to cultivate outside sources for the creation of civic value. The open data programme itself has turned into somewhat of a collaboration that articulates the service-enabler model. While the City Council retained responsibility for the platform, community organizations were given the responsibility of conducting the projects and to develop prototypes of open data policy. But open government is being driven forward here by unfortunate economic circumstance as much as by optimistic ideology, referring to the budget cuts as part of the national plan of austerity. The city gates may be opening only because the city walls are crumbling.

Our conceptual model supposed that, theoretically, Open Government and Smart Cities had shared components. This overlap is characterized by efforts towards greater transparency, participation, and collaboration where possible. In our observations little could be further from the truth, mainly due to the technical nature of the smart city project. This is certainly important to its foundation, but the humanistic elements that have been propounded in recent literature, that emphasize the same qualities as open government, are essentially missing here. Despite the consistent framing of open data as a smart city measure, the Citizen Sensing project and Bristol's Smart City project, BristolisOpen, were diametrically opposed, and apparently shared little communication. The commons/consensus-based policies of the Citizen Sensing project were developed specifically to contrast with the technological focus of BristolisOpen. However, the city's intent to extend their

smart city infrastructure specifically so that the open data projects may incorporate it suggests that the smart city itself is in its early days, and there may be a reconciliation in the future. That one respondent claimed that a smart city is impossible without open data seems to recognize this possibility as fact.

5.2 Transparency and Open Data

Below, we compare our research responses towards open data with the necessary qualities of open data that were determined in our theoretical framework.

Open Data must be:

- **Available – Always online and free**
- **Accessible – Well-organised and integrated, understandable, machine-readable**
- **Reliable – Authorized, secure, complete, correct**
- **Reusable – For redistribution, processing and analysis**

Not all data was available, as there was data within the Council that was trapped in information silos. The rate-limited nature of the open data API also prevented total availability. The idea of the information asset register was proposed as a transparency measure of open data itself, to enhance availability overall, but the configuration management piece being performed in the Council that could yield this was not yet completed by the time research concluded. It does seem that this idea and a variety of data standards are emerging as supplements to transparency.

Accessibility as separate from availability stood out as a major issue. Open data cannot be understood by those with no concept of data. An ability to accurately assess data is seen as a necessary quality in self-empowered citizens, and data accessibility is more dependent on each user's ability rather than data quality. The work of specialized intermediary groups was instrumental in increasing the accessibility of open data for ordinary citizens. Again, the Council was assessing the presence and quality of training programmes in the city, but this had not been completed by the time research had concluded.

There were only a few complaints about the quality of the data, but neither were there many spare compliments. Open data occasionally suffered from a lack of context, both in the data itself, in the metadata, and in its methods of collection, which rendered it practically useless for some respondents. In some other cases, accessibility and usefulness suffered as a result of privacy concerns. Even the reusability of open data was hampered by confusion or hesitation over licensing issues. Most if not all of these barriers had been previously identified in Janssen et al. (2012), and though there are many barriers that this open data program has overcome, the ones that remain are significant.

Open data had already been identified as a form of information transparency at the outset of this thesis, and for the most part this was readily affirmed in our observations. But this transparency was more directly motivated for the sake of accountability than for empowered participation. This differs with the conclusions of Worthy (2010) that participation was on a level standing with accountability in motivating open data. We were able to observe how data is transformed, and analytical transparency is accomplished, explicitly by integrating different data sets. Open data was then able to provide integrative transparency if and when it was visualized for the sake of easier dissemination, which meant that different actors were able to attain more closely aligned worldviews by having this reference point in common.

Likewise, the re-use of open data was intended more directly for self-interest than for assisting in governance. Under the current strategy, open data is to be released in such a way that others have a commercial incentive to construct products or services from them. But this has been met with different kinds of stiff resistance, as businesses have a reluctance to create vulnerabilities for oneself while civil organizations have a disinclination to privatize what has been made public. This could mean that less data will be provided to the open data platform, and transparency is diminished correspondingly.

5.3 Participation and Empowerment

The approach to open data as a measure of informational transparency through disclosure encourages only token forms of participation at best, categorized by Arnstein (1969) as enabling and engaging. Furthermore the two facets of empowerment, mastery over one's own life and democratic participation, though not mutually exclusive, are quite differentiated here. But both facets depend on a helping hand upwards, that is to say that empowerment largely depends on the empowered, and self-empowerment is a much less likely phenomenon. As long as this caveat is acknowledged, open data can be said to foster empowerment, as people are lured by its potential and are willing to seek help in making the most of it.

On the one side, intermediaries assist by translating data into information and making it more accessible, allowing citizens to use that information in their daily calculus, or by helping to educate such citizens to the point where they can analyse data for themselves. This facet of empowerment is being fulfilled, at least in part, as an ongoing process. These intermediaries, be they a company or non-profit, have the expert knowledge, skills, means of access, and the time to dedicate themselves to working with open data, usually in a specialized area. They perform the hard work of transforming data into information that can be more easily disseminated and understood, increasing overall levels of transparency via open data. Intermediaries also function to find and target groups for engagement; in an indirect way, they serve to put a face on the data and give data the agency to

engage. Even if one uses tools to help themselves understand data, these tools are often created by intermediaries solely for the purpose of helping others empower themselves. The results of this research support the argument of Baack (2015) that 'empowerment through open data can only be realized with intermediaries that make raw data accessible to the public' (2015:6).

On the other side, the democratic facet of empowerment is arguably ready to be fulfilled, but local government must provide official channels for empowered citizens seeking to participate, or a collaborative environment to enter into. The routes to self-empowered participation in governance are currently unestablished, or there is no such environment perceived, other than the normal positions of voting or advocacy which are situated rather on the outside looking in. In our observations, citizens often remained on the periphery of policy design, contributing mainly through advocacy. While citizens are perhaps unable to self-empower enough to meet the government halfway in developing collaboration, they are being empowered to participate somewhat through the help of civil organisations that function as data intermediaries. Those citizens that were involved in the Citizen Sensing project did contribute to policy relating to the project as well as participating in the project itself.

While consultations, forums, and community engagement events are held, the nature and timing of these events are the prerogative of the Council. Other opportunities for participation were enclosed as competitions or hackathons, and which did not include the development of decisions or new policy. Most formal relationships between public bodies and outside organizations took the form of contracts, which transferred process and decision-making power as well as responsibility from the Council to the other party and thus became pseudo-collaborations as described in Agranoff (2006). Some of the partnerships we observed contained some features of collaborative governance, but not all were found in one place. Overall, opportunities and incentives to participate remain low and there is the ever-present factor of it being 'early days.'

Our research contradicts with the results of Jetzek et al. (2013) which concludes that openness increases participation. Foremost among our speculations as to why this has occurred is the fact that Jetzek et al. used a measure of *e-participation*, which is also a composite of the different forms of participation that we identified for our study. Therefore, while the confirmation of Jetzek et al.'s hypothesis may be as a result of increases in enabling or engaging forms of participation, our research that focuses more closely on empowered forms of participation produces a different result. Furthermore, the quantitative nature and research subjects (worldwide experts and professionals; Annoni et al. 2012) of their study may also be significant in the differing results. We believe that these differences promote the need for more case studies.

5.4 Collaborative Governance

A perfect example of collaborative governance was not to be found in Bristol, as was mentioned in the Findings. But if we take a closer look at the flagship Citizen Sensing project at the Knowle West Media Centre, we find that the organization, by functioning as an intermediary through maintaining relationships with both citizens and the Council and by empowering citizens with regards to data, contributes to a prototypical collaborative environment that could provide some hope. The Council and the programme producer both acknowledged that the project was meant to divine policy for future open data projects as part of the larger smart city program. Thus, while we may only have one good example to analyse, it is the example that the future is waiting to follow.

If we relate our observations of the Citizen Sensing project to the qualities of collaborative governance that were included in our conceptual model, we may identify the areas where the project matches.

Qualities of collaborative governance:

- **Between public agencies and non-state actors (including communities, stakeholders, and experts)**
- **Formal, deliberative, consensus-oriented environment**
    - **Possessing clear process rules, an inclusive environment based on open communication**
    - **Facilitated and administered by leadership**
- **For the production or management of policy or public resources**

That the project began by looking at the issues people care about is more or less synonymous with the phenomenon of collaboration generating out of the identification and addressing of wicked problems. As a matter of objective, the project directly fulfilled many of the benefits of collaborative networks as also defined by Agranoff (2006): providing social and technical skills for the individuals, access to information or resources for the organisation, collective process skills for the interacting organisations, and the object of the collaboration itself, be it an action plan or policy change etc (Agranoff 2006:58). Their organisational processes had all the qualities of being a deliberative and consensus-oriented environment, fulfilling all the criteria for public policy consensus-building described in Booher (2004). Specifically, the innovations of the citizen sensing methodology, characterized by problem-oriented nature of the project in which the citizens performed the role of identifying relevant issues, followed by crowdsourcing data and steered by a commons process of decisions, directly addressed the concerns of Janssen et al. (2012) that an understanding of the external world and feedback from users are imperatives for improvement which they felt to be missing, and that ‘existing government instruments are not prepared to deal with open data system’ (Janssen et al. 2012:266). The problem-orientation of the project also meant that it focused more on the management of public resources, while the data gathered by the project qualifies as the

production of a new public resource. But it remained unclear if public policy has yet been affected by the project, other than the policy regarding open data projects themselves.

While the project environment strived to be informal, to appear more welcoming and inclusive, the presence and efforts of the organization itself serves as leadership that facilitates this environment in a formal way. Intermediaries that take on the leadership and facilitator role may function as a broker or boundary spanner between stakeholders, engaging them independently in order to bring them together and encourage collaboration between the two. The project itself may have been limited in its prototypical form, but the structure of ongoing relationships that are emerging here appears to be forming new institutions that, as time goes on, will become more entrenched and will further increase the importance of intermediary organizations such as the Knowle West Media Centre.

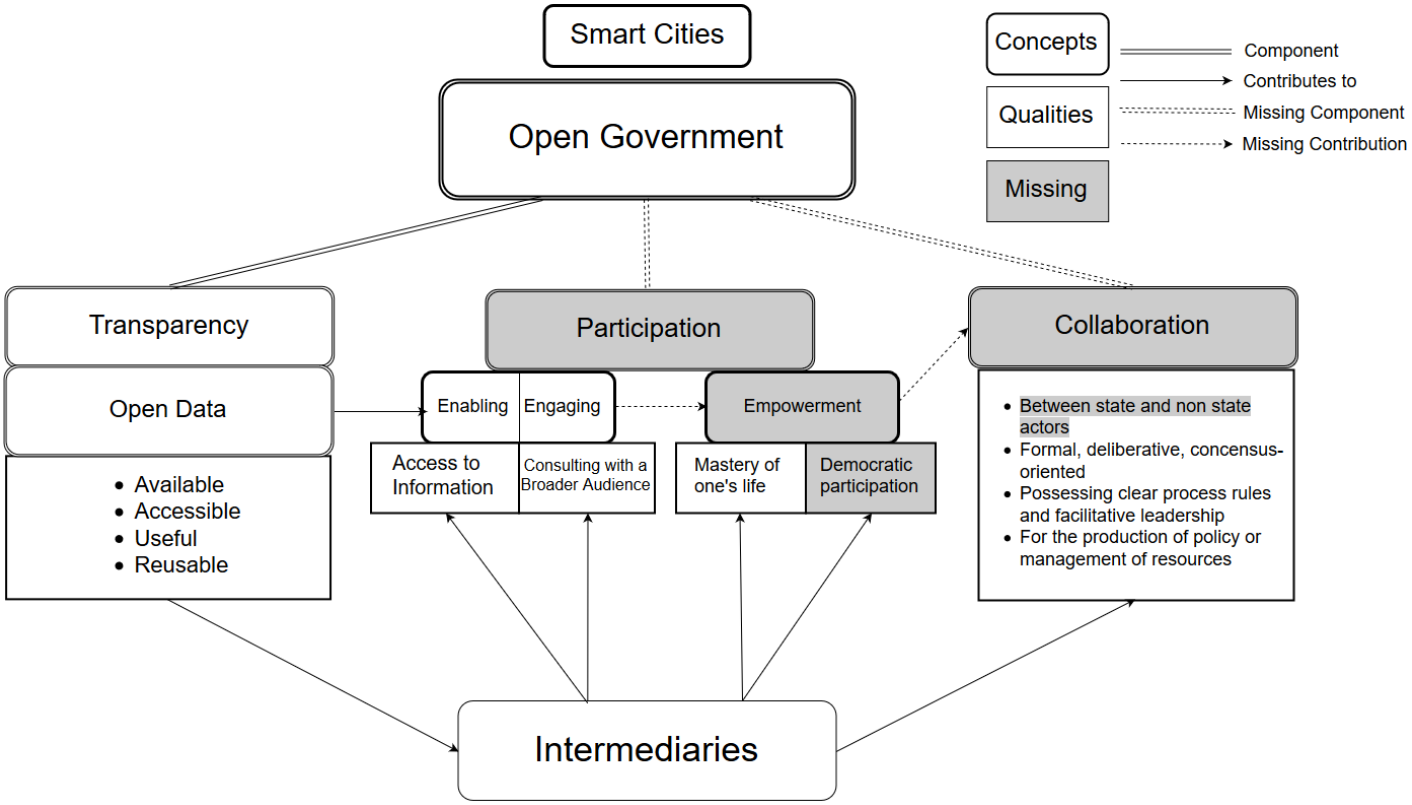
But the Council was not as fully involved in this environment as would qualify for collaborative governance. Beyond the vague claim that the project was 'working closely with the housing and properties team,' the Council's greatest contribution was funding. It appears the government is as of yet hesitant to engage in outright collaboration, and if open government is a step-wise process from transparency to empowerment and to collaboration, it appears many citizens waiting on the final step. As such, regardless of how successful the project is in generating collaboration, it is not collaborative governance. In any case, it must be acknowledged that the Council did not explicitly intend for open data to be a vehicle for collaboration, and could be said, regarding the transition to the service-enabler model, to have designs to skip collaborative 'partnerships,' in the language of Arnstein (1969), in favour of 'delegated power,' where citizens and citizen groups have dominant decision-making authority, or are at least responsible for service delivery. Phrased in a different terminology, in our observations we were unexpectedly presented with the phenomenon of a 'hollow state' (Milward and Provan 2000). The hollow state refers to a situation where a government or governmental agency relies on others (firms, nonprofits, or other government agencies) to jointly deliver public services, and in extreme cases, devolves all its production capability to third parties, perhaps retaining only a 'systems integration' function that is responsible for negotiating, monitoring, and evaluating contracts (ibid:362). This would appear to forego the benefits of collaboration such as joint fact-finding and stronger legitimacy of decisions, while relying especially on a system of trust which may or may not have been developed naturally already, which would mean a dramatic increase in uncertainty. Bristol is not yet an extreme case, but the responses that were gathered relating to the service-enabler model appear to have a great deal in common with a hollow state. Collaborative governance does have its faults, including a time-consuming and resource-intensive initial investment that the government is not perhaps not prepared to make, and

which is not guaranteed to produce results (Ansell 2012). The lack of collaboration and the government's lack of intent to collaborate speaks to worst fears.

5.5 Analysis Model

Below is a redrawing of our conceptual model incorporating our findings. In our composite construct of ideal types we have marked those aspects which we found to be missing. Smart Cities has been separated from Open Government as, though a smart city project exists, none of our observations suggested that it contributes directly to the program of open government as of yet. Open government retains Transparency as a component pillar, but we do not feel that Participation and Collaboration as we observed them qualified as being manifestations of an Open Government. Transparency in the form of open data constitutes a greater access to information, establishing token forms of participation. But the meaningful forms of participation were missing, and so Participation as a whole is shaded. Open data can lead to empowerment only as far as establishing a greater mastery of one's life, though it is most likely to do so through the assistance of empowered intermediaries than through self-empowerment, indicated by the staggered line from token to meaningful forms of participation. Indeed, it is likely that engaging as a form of participation would also be missing were it not for the work of intermediaries. Intermediaries assist in translating open data from into more useful forms through visualizing the data, helping to enable citizens, and also engage citizens over problems, organize incentives, and provide resources and training, which induces empowerment in the form of greater mastery over one's life and circumstances.

Figure 4: Analysis Model



Collaborative governance was altogether missing, as we have indicated by the shaded area and staggered line. Open data almost certainly would form the basis of empowered participatory governance and collaborative networks, but such opportunities are left waiting in the wings while the government appears unable to invest the necessary resources to realize them. This has not stopped users of open data from trying, and intermediaries are just as important in facilitating democratic participation so far as it manifests currently, though this mainly takes the form of advocacy. The Citizen Sensing project is an example of an open data project in which some aspects of collaboration were visible, and has the attention of the local government, but not its greater involvement. The relevant quality of collaborative governance, that it take place between state and non-state actors, has been shaded out in the model above. For true empowerment in the sense which produces collaboration, greater effort is needed on the part of the government to empower stakeholders and, at the very least, include them in decision-making processes. But as we have observed, greater circumstances may mean that the government is forced to forego collaboration altogether, becoming a hollow state. In such a case, it is possible that the mantle of collaborative leadership may pass to these intermediaries.

6. Conclusion

In this last chapter, we will refer back to the beginning and the questions we started out with. Some other final thoughts remain, including making room for the overall impression that our research has made, but now with the added benefit of hindsight. Also included are some extra observations that were not immediately relevant to the research but still made an impression and helped to build out the context and culture in which our research was performed. We leave some recommendations where we feel confident to do so and admit our limitations that should be heeded by future researchers in separate sections below. Lastly, we relocate our research in the world at large and the current political climate it strives under, and make an argument for why it should.

Sub-question: How are the concepts of open data and smart cities described in the literature?

Our conceptual model proposed that open government and smart cities have great overlap in their theoretical models, particularly in what has been referred to as the 'humanistic' side of smart cities. A smart city was chosen as the context for our research for this reason. But this overlap vanished in our observation of real-world implementations, rather because the smart city project remained technologically focused. At the moment, the major smart city project in Bristol is more of a technically driven triple-helix arrangement of the kind highlighted in Lombardi et al. (2012). This means that currently there is little emphasis on transparency, participation, or collaboration with ordinary citizens. Efforts to improve the technology used for open government were observed, but there was little consideration for efforts to improve the openness of the smart city. However, it must be admitted that this may yet be two ways of looking at the same coin, for as the base materials of these programs are so similar it is perhaps inevitable that they will become alloyed, as technology promotes openness which in turn promotes better use of technology. The influx of technology into government, which was the impetus for open government in the first place, is surely only to accelerate, and the transition to a service enabler model may nurture the participative element of the smart city.

Open data is perceived to provide a viable means of transparency, particularly informational transparency, though total openness of the data was hampered by issues of quality, a high entry point for accessibility, and confusion over licenses for re-use. Most urgent among these is the issue of licenses that altogether prevent the open data landscape from being coherent and easily navigable. Underneath this is a conflict among the philosophy of open data and what it should be used for, which is why this matter is the most pressing. If this deterrent is removed, accessibility is the next most important issue, one that will require ongoing maintenance. New datasets will require cleaning and preparation, visualization and dissemination in order for open data to be effective in

any form of influence on the public. But as these issues are widely acknowledged they are unlikely to exacerbate, and open data will continue to grow more effectively transparent. The public themselves must become more open to the concept of data, but this entails a cultural shift that cannot be planned so much as hoped for.

Sub-question: How is collaborative governance defined?

Our principal example of collaboration in the Citizen Sensing project was a faithful implementation of its theoretical structure, where collaborative mechanisms are activated in good faith out of an ideological commitment to the democratic principles of collaboration. But though democracy theoretically contributes to a stronger legitimacy of decisions, decisions that are made through democracy can only be legitimized by the official institutions of government, whether they are democratic or not. Where collaboration is able to have a real impact depends on the degree to which the government is forced to devolve their responsibilities and decision-making power. As of yet, the government finds themselves in limbo between having not devolved any decision-making power to citizens, or to organisations who may facilitate collaboration, and planning to devolve almost all responsibility to these organisations and the communities they represent. This fragmentation of the city council is surely to produce greater amounts of collaboration by necessity, as the devolved communities are still but a piece of the city. But it will not necessarily produce collaborative governance in its democratic, deliberative form.

Sub-question: Is open data used in governance?

Open data was only intended to be used in governance as far as providing accountability through transparency. Otherwise, that open data was more explicitly designated as a resource for use anywhere but governance (more specifically, earmarked for economic development) seemed to be somewhat of a surprise to everyone, who find an intuitive connection between the availability of public data and using that data to improve the public system (in agreement with Schrock and Shaffer 2017), and do not find the notion of open data as a commercial resource nearly as intuitive. Supportive of this was the fact that our respondents who had successfully turned open data into the basis of their livelihoods did so as data intermediaries – finding ways to support themselves *in the business of* improving the public system, whether through improving traffic policy, environmental awareness, or as a general consultant.

Sub-question: Do users of open data feel empowered to participate in governance?

In our theoretical framework we identified three forms of citizen participation that resulted from the use of information technology in policy-making. These were enablement, engagement, and

empowerment. Open data functions to enable participants directly by providing a greater access to information, but transparency is unlikely to function by itself to increase engagement or empowerment. For while open data is perceived to provide a resource for self-empowerment, the process of self-empowerment has proved more difficult than first presumed. A person must possess a considerable amount of time, resources, and training to self-empower themselves using open data. As a result, most of the population is deterred. Our research supports the conclusions of Wijnhoven et al. (2015), that the perception of how complicated, time-consuming or technical a public project is will generally discourage people from participating.

These more meaningful forms of participation depend on other entities who are already self-empowered with regards to open data, and that function as data intermediaries to increase the transparency and usefulness of open data.

Sub-question: What qualities does such public participation have?

But even those who are self-empowered lack options for meaningful engagement with their local governments. We observed that while the increase in transparency through open data was almost universally welcomed, the primary reason for public enthusiasm towards open data was its use as a resource that would primarily enable a closer monitoring of the urban systems in which they were stakeholders, a resource that was intrinsically linked to public participation in the form of collective adjustment of these systems, as conceptions of the smart city put forth. But this link was apparently less obvious to decision-makers, or more likely is being neglected out of a lack of resources to sustain citizen participation. But it is a failure of policy-makers that these options do not exist, even if the stated purpose of open data was not to increase engagement primarily. While open data is in this case presented as a resource for commercial development, it does not do very much to supplant other resources necessary for launching an enterprise, such as time, expertise, and financial investment.

The primary question of this thesis was **how the open government and smart city mechanism of open data, as a form of information transparency, influences collaborative governance.** Specifically, does increased transparency encourage citizen participation and form a basis for collaborative governance. What we have learned is that open data has been moderately successful as a measure of transparency and is seen as a vital part of the smart city. Open data can be successful in fostering collaboration but has had a lack of influence in fostering collaborative governance. This lack of influence is greatly attributable to external factors which have prevented open data or collaborative governance from receiving resources or priority. Our results indicate that citizens are ready and willing to collaborate, but the government has yet to engage. Without official

channels and meaningful incentives for participation, and the greater involvement of the government for these collaborations to be institutionalized, collaborative governance is not achieved, and the entire smart city programme miscarries. The explanation the government supplies is that budget cuts have forced them not merely to avoid collaboration, but to begin a process of wholesale devolution which will preclude collaboration, as responsibility for services will solely be transferred to the hands of citizens and their neighbourhood, community, and social organizations.

6.1 Recommendations

The potential for open data has been widely acknowledged in our research since the very beginning. Any discussions on the subject, whether with research respondents or those that were met along the way, usually included an example or idea for a project, indicating an enthusiasm for data that augments its potential. What is clearest from our observations and the first thing that we should recommend is the local government reconsider their position on collaboration and form some kind of outlet for this potential. Because, in the words of one respondent, people "were willing to do some quite crazy things even in their spare time."

Bristol was chosen for its exalted worldwide status as a smart city and an open government. But other case studies must be performed in other cities that aspire to the same qualities in order to determine how those qualities can best be achieved and implemented. Different structures may have emerged in different contexts, for better or worse, and other cities may surpass Bristol in different ways. Parallel to this, other research should make an analysis of policy documents relating to open data, as there are many models of open data policy that would contrast and compare with the Citizen Sensing model.

Open data contributes to transparency, but could benefit from supplementary transparency measures of its own, such as an information asset register and a system of standards. A more detailed examination into the requirements to use open data, including technical skills, should be conducted, with the aim of determining if these barriers to entry can be systematically lowered.

Where policy has resulted from the use of open data, studies should be undertaken to observe exactly how open data influenced policy, and if there were certain identifiable qualities of the data that contributed to the development of the policy, or if the inclusion of open data provided definitive changes to the policy development process. Likewise, decision-making processes where open data informs those decisions should be observed, to assess the mechanisms by which open data affects democracy.

6.2 Limitations

This study felt most limited by the number of interviews collected, and that a greater number of interviews would provide further corroboration to what has already been said by our research participants, as well as providing more unique and useful perspectives. The number of people working primarily with open data, as opposed to occasionally or as a side-project, appears to be low. The internal validity of this study is threatened most by this fact, though not enough to call the entire study into question. Our respondents spoke from positions of considerable knowledge of the field and therefore authority, and a case study benefits from a small sample through a deeper understanding of the research phenomena, and the minutiae of their relationships (Flyvbjerg 2006). We feel that this is true in this case.

A low number of interviewees may be to some extent attributed to the same factors that led respondents to claim that it was early days for open data, despite the fact that nearly a decade has passed since the inception of many open data programs. The Bristol Open Data portal was only launched a few years ago but has already been redesigned and overhauled, and more than once during the course of our research. In addition, there was also considerable turnover in the formal positions relating to open data in the Council since the launch, specifically the project manager for Open Data itself, at least once during the course of our research. This instability has almost certainly prevented the open data program from progressing in a timely fashion, which may have translated into being unprepared and reluctant to engage with our research.

6.3 Discussion

This paper sought to compare how the theoretical ideal types for several concepts were capable of being implemented and to compare how these ideal types fared in interaction with each other. What was discovered was that none of the ideal types were fulfilled in all their characteristics, and more broadly, that the circumstances of the world-at-large prove that ideal types developed in vacuum of theory are quite fragile. In addition, in our theoretical framework we often noted a progressive, step-like nature to the programmes at the foundation of our study (in the case of open government, see De Blasio and Selva 2016; in the case of smart cities, see Schaffers et al. 2011). The concepts involved were more convoluted upon closer examination; what we found in our research observations was that these steps were often applied out of sequence, on a basis of what the context appeared to require – more suggestive of fancy footwork than one-two steps. This also reinforces our notion of the fragility of ideal types, and specifically demonstrating a fragility of theoretical programmes against real world circumstances. But on the other hand, that ideal types are poorly or unconventionally implemented is not the fault of the ideas in themselves, and our research suggests that if greater discipline were applied in implementation, the programmes would

be able to better fulfil their theoretical potential. For as the principles involved have been noted to be interdependent, the programme must be implemented as a whole in order to prevent being handicapped. Our strongest conclusion is that the programmes as far as they have been implemented have created an environment that yearns for the missing pieces.

There also remains a specific argument to be made for open data in spite of the real-world circumstances observed to be holding it back, specifically the maiming of government through austerity, a wicked problem in itself. Given more significant investment and priority than was observed and a greater integration on a national or international level, open data and the mechanisms that it encourages (culminating in collaborative governance) could ameliorate some of the pressures being laid on governments. Open data appears to have an affinity for addressing wicked problems, for the use of open data inherently promotes many of the collaborative mechanisms designed to directly oppose wicked problems. That the majority of open data projects examined were problem-oriented supports this theory.

The emergence of the entities we have referred to as intermediaries is also directly linked to these circumstances, in accordance with Gonzalez-Zapata and Heeks' reasoning (2015), and does shift the centre of gravity towards collaboration as Schrock and Shaffer suppose (2017). Intermediaries help to spread risk to stakeholders and regardless of their contribution are stakeholders themselves, and through activating other stakeholders intermediaries show a capacity for collaborative leadership. For example, the success of the Citizen Sensing project was arguably due to the collaborative environment that was used to address the mutual problems of the collaborators, and open data was the foundation of this environment. Yet, despite the mutually supportive elements of open data and intermediaries towards collaboration, collaboration itself has not been institutionalized as governance per say in any of the cases observed, which has led to a general impression of open data falling short of its potential.

Referring back to previous sources that had also identified the importance of intermediaries, Gonzalez-Zapata and Heeks (2015) identified five different roles that these intermediaries play, demanders, producers, validators, developers, and communicators of open data. This is in accordance with the sequence that data follows towards becoming open, and then valuable and useful knowledge. The organizations that were included in our research often fulfilled more than one of these roles at once primarily, but it would be more accurate to say that they fulfilled all of them. As we found, an intermediary is specialized as regards the data that they work with, and therefore guide it every step of the way. By becoming the de facto point of contact for particular datasets, the position of intermediaries is further entrenched.

The policy of promoting open data for the purposes of economic development could also lead to a state in which whatever data is made open will simply move from one information silo to another, as those in the business of open data will quickly monopolize the information value chain through what amounts to a legal process of enclosure[21] (for an example of how this has already occurred in the Netherlands, see Meijer and Thaens 2009). If this becomes standard practice, integrative transparency and civic wealth will be neglected, as it is less likely that community organizations operating in the public interest will have a viable means of accessing data.

While this remains the status quo, while the majority of the population is unlikely to feel enabled by, or to engage with, open data, those that are able to use it as a resource for self-empowerment are given disproportionate power, causing a distortion in democracy, even if their only avenues for exerting this power appears to be advocacy. Nevertheless, this forebodes a vision of technocratic oligarchy that mirrors the state of the world's economy, one that has created a society marked distinctly by historically unparalleled inequality and a polarized, withering political sphere.

It has often been said, and was referred to several times in the course of our research, that 'data is the new oil.' If we speculate that, by this analogy, data is meant to be the dominant fuel of engines and resource of ubiquitous use, a currency in its own right and the foundation of the world economy, then it also points to the idea that if there were ever a time and a place and a method to reverse the tide of austerity and the resultant hollowing of the state, a strong argument can be made for empowered collaborative governance on the basis of open data.

[21] https://en.wikipedia.org/wiki/Enclosure

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Appendix 1 – Interviews

NAME	ORGANIZATION	LENGTH	DATE
Martha King	Arts Program Producer at Knowle West Media Centre	30:35	18/10/2017
Richard Wilson	Founder, MobilePie Games	26:31	19/10/2017
Dan Campsall	Founder, Crashmap	37:05	17/10/2017
Dr. Bobby Stuifzand	Data Science Specialist, University of Bristol	30:04	10/4/2018
Natalie Thurlby	PhD Student, Computer Science Department, University of Bristol	44:56	22/3/2018
Emily Pole	PhD Student, Chemistry Department, University of Bristol	44:56	22/3/2018
Louis McGregor	PhD Student, Complexity Science in School of Social and Community Medicine, University of Bristol	44:56	22/3/2018
Rob Arbon	PhD Student in Computational Chemistry, University of Bristol	33:50	11/5/2018
Heather Saxton	Programme Manager, City Innovation and Sustainability, Bristol City Council	1:08:43	17/5/2018
John Kellas	Consultant; Founder, This Equals	1:10:00	11/6/2018