

10 Open Government Data for Inclusive Development

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Introduction

This chapter examines the relationship between open government data and social inclusion. Twenty-eight open data initiatives from the Global South are analyzed to find out how and in what contexts the publication of open government data tends to result in the inclusion of habitually marginalized communities in governance processes, such that they may lead better lives.

The relationship between open government data and social inclusion is examined by presenting an analysis of the outcomes of open data projects. This analysis is based on a constellation of factors that were identified as having a bearing on open data initiatives with respect to inclusion.

The findings indicate that open data can contribute to an increase in access and participation—both components of inclusion. In these cases, this particular finding indicates that a more open, participatory approach to governance practice is taking root. However, the findings also show that in the cases studied here, access and participation approaches to open government data have not successfully disrupted the concentration of power in political and other networks, and this has placed limits on open data's contribution to a more inclusive society.

The chapter begins by presenting a theoretical framework for the analysis of the relationship between open data and inclusion. The framework sets out the complex relationship between social actors, information, and power in the network society. This is critical, we suggest, to developing a realistic analysis of the contexts in which open data activates their potential for transformation. The chapter then articulates the research question and presents the methodology used to operationalize those questions. The findings and discussion section that follows examines the factors affecting the relationship between open data and inclusion and how these factors are observed to play out across several open data initiatives in different contexts. The chapter ends with

concluding remarks and an attempt to synthesize the insights that emerged in the preceding sections.

Structural Inequality and Development in the Information Society

It is a truism to describe digital technology in general, and the Internet in particular, as having a pervasive and profound impact on the development of humankind. So much so that Castells and Himanen (2014) propose a new mode of development—*informational development*—that drives material wealth creation in the twenty-first century. While the creation of material wealth does not necessarily result in the betterment of the lives of all (Ravallion 2016), Castells and Himanen suggest that a synergistic relationship between informational and human development has the potential to underpin sustainable and egalitarian social progress. This comes with the recognition that development is not only about capital accumulation or social and economic progress, but about the widening of people’s choices (Haq 1998), the removal of *unfreedoms* (Sen 1999), as well as improvements in living conditions and the provision of basic needs (Nayyar 2003).

The relationship between informational and human development is dependent, however, on “social interests and power relationships” (Castells and Himanen 2014, 17). For example, if informational development drives material wealth creation, unequal access to information may create further imbalances and inequalities in people’s material conditions. As growth tends to favor higher-income groups to the detriment of those at the lower end of the income scale (Chen and Ravallion 2007; Ravallion 2016), the availability of information may empower the empowered without proper safeguards in place. Therefore, the role of government is critical, as it is government that determines the corrective and redistributive policies required to create the conditions for balanced, inclusive development (Castells and Himanen 2014; Kohli 2004; Chang 2003).

At the same time, however, governments are not immune to the politics of accumulation and distribution. Governments have used the mechanisms of the welfare state for political patronage and clientelism, often resulting in the double-edged sword of a disempowered citizenry on one side (through increased dependency on the state) and a government tightly coupled to the financial sector, to the exclusion of a significant portion of its population, on the other (Castells and Himanen 2014). This latter condition is made possible by the fact that knowledge-intensive, globally connected, and technologically advanced sectors of national economies operate in the ahistorical, placeless space of flows that characterize the new social order of the network society

(Castells 2007, 2009). Castells and Himanen (2014, 14) comment, “This is, in fact, the structural basis for the growing inequality, polarization, and marginalization that characterize the situation in most countries in the world, despite high rates of growth in many areas of the planet.” Therefore, development strategies must contest and contend with the new structuration of society if it is to deliver equitable progress toward better lives for all.

Open Data and Inclusion as Political Participation

Data are a valuable resource in informational development, prized and exploited by those small and highly advanced sectors of globally networked economies. Open government data [i.e., data free to be reused without any restriction (GovLab and Laurence 2014)] are also of value to these exclusive sectors, and bold claims have been made that open data are worth, in financial terms, \$3 trillion per annum to the global economy (Manyika 2013). Yet it remains an open question who will benefit from this purported boost to the global economy.

Open government data, as a public rather than a private resource, are embedded in principles of universal access, participation, and transparency, and, according to advocates,¹ promise to restore trust between citizens and government by making the latter more accountable and inclusive (Horrigan and Rainie 2015; O’Hara 2012). Ideally, increasing transparency should empower citizens to participate in and hold public institutions to account for the distribution of benefits that support human development. Accountable governments, in turn, are more likely to put in place the kinds of policies required to restore a developmental balance in the form of a socially productive synergy between informational and human development.

Open data can play a role in restoring such a balance between informational and human development that proprietary data are precluded from playing. Common to all definitions of open data is the condition of universal access. Access is critical when there is an expectation for open data to lead to data use and impact of a more inclusive kind. If one dispenses with unfettered access to the data, one foregoes transparency and accountability (in governance); replicability, verifiability, and efficiency (in science); and, particularly in the case of open government data, equal opportunity and socioeconomic development. A core value held by many proponents of open data is that it is inherently inclusive as such, and (theoretically at least) it democratizes access to informational resources (Kitchin 2014).

But some have highlighted several issues about the theorized benefits of open data. As far back as 2010, Gurstein expressed concern about the false hope of open data

automatically resulting in greater social inclusion. He took his cue from early evidence emerging from real-world outcomes: “By raising fundamental issues in understanding the societal aspects of e-governance, it highlights the need to replace politically neutered concepts like ‘transparency’, ‘efficiency’, ‘governance’, and ‘best practice’ with conceptually more rigorous terms that reflect the uneven terrain of power and control that governance embodies” (Gurstein 2010). Peixoto (2013) contends that open data as a form of transparency do not necessarily lead to accountability if political agency is absent. A survey of the contribution of open development by Bentley and Chib (2016) finds that the research literature does not support claims that open development projects nor open data initiatives typically result in the inclusion of poor and marginalized communities. One reason is that the benefits of openness are largely dependent on the capacities of users to exploit it as a resource for public benefit (Gurstein 2011; Davies and Bawa 2012; Canares and Shekhar 2016). How openness is structured and the contexts in which it is embedded are at least two further determinants of who benefits (Gurstein 2011; Johnson 2014). Research on open data, while cognizant of the lack of deep knowledge on the topic (Davies and Bawa 2012), has not explicitly been directed toward this fundamental concern raised from the outset.

One of the central challenges of open data, then, is to actualize the core value of inclusion. To do so requires an understanding of how and in what contexts open initiatives are inclusive, which open initiatives have been successful and which have been unsuccessful, who is included and who is excluded from the outcomes of these initiatives, and whether the inclusion made possible by open data has empowered those included to reprogram the network so that the benefits of development are more equitably distributed throughout society. To explore the relationship between open data and inclusion, this chapter deals with the following questions: Do open data contribute to inclusive development? More specifically, how, for whom, and in what contexts do open data contribute to inclusive development?

Networks, Data, Power, and Inclusion

The literature on inclusion differs across disciplines. Inclusion, in economic development, occurs when growth is accompanied with falling inequality and decreasing levels of poverty (Piketty 2014; Ravallion 2016). In sociology, inclusion is an amalgamation of processes intersecting at both the individual and societal spheres that result either in the welcoming, acceptance, and provision for, or the ostracism, rejection, and nonacknowledgment of a person or a group of people (Allman 2013). In development studies, inclusion takes place when all people contribute to creating opportunities,

participate in decision-making, and share in the social and economic benefits of development processes (Hickey, Sen, and Bukenya 2015). Castells, possibly attempting a supradisciplinary definition of *inclusion*, defines the concept as the systematic ability of individuals or groups to access the means for meaningful survival (Stalder 1998).

In this chapter, we anchor our view of inclusion in *political participation*—that is, whether individuals or groups of people enjoy equitable opportunities in shaping how they are governed and achieve and benefit from desired governance outcomes (Habermas 1996; Yuval-Davis 2011). Our approach to inclusion is political because it is inseparable from power, as highlighted by Gurstein (2010, 2011) and others [see, e.g., Arnstein’s citizen control (1969), Pretty’s self-mobilization (1995), and Hurlbert and Gupta’s adaptive governance (2015)]. Access and broad forms of participation are important stepping stones to inclusiveness but do not necessarily confer agency on or empower those being included; access and participation may simply result in a “voice without agency ... [and] presence without politics” (Singh and Gurusurthy 2013, 186) for previously excluded communities.

Inclusion is meaningful if material wealth and nonmaterial benefits (such as dignity and health) accrue to those habitually excluded. For those benefits to accrue, though, access to information networks and participation in the decisions taken by powerful nodes² in those networks are necessary conditions, as networked information flows have become the primary setting for human agency (Castells 1996; Stalder 2005). As Castells (2017, 72) states,

There has been no economy and no society in the world in which wealth and power do not depend on information and knowledge. It has always been the absolutely critical matter for wealth generation and power generation. What has changed is...the information and communication technology revolution...with all its consequences: the ability to create organizational forms; the infrastructure and the rapidity of processing information, transforming it into knowledge; and using these transformations into knowledge to make actual changes in the production system.

Reilly and Smith (2013) argue that openness signifies more than access to technology; it entails changes to the patterns of development and the distribution of information, cultural production, and knowledge in the direction of what Walton et al. (2016, 4) refer to as “networked social morphologies.” According to the rules for such openness, traditional hierarchically controlled modes need to make way for spaces that support networked social arrangements. While open data promise universal access and democratized participation, any developmental strategy focused on “spaces for achieving openness” needs to be mindful of the space of information flows and the new networked social arrangements that this space introduces, including the unavoidable

binary condition of inclusion in and exclusion from global networks of wealth and power (Castells 1996, 2009; Stalder 1998).

The social dynamics of networks draw attention to a critical missing element in the assumed revolutionary potential of open data. If access and participation are to have meaningful outcomes, the habitually and systematically excluded must be able to access and participate in networks with something of value to offer the powerful established nodes in networks where decision-making is concentrated and the program for the network is determined. Once included, the opportunity arises to attempt the reprogramming of the dominant logic of the network to redirect the distribution of benefits in a more equitable fashion (Castells 2009). This shaping is unavoidably a struggle for power (Gurumurthy and Singh 2016).

Castells (2007, 29; 2009, 42–47) identifies four types of power in the network society. *Networking power* is the power of social actors in global networks over those who are not included in these global networks. It operates along the binary conditions of exclusion and inclusion. *Network power* is the power exercised by those in networks (typically those at the source of the network's formation) who prescribe the standards or protocols that determine the rules of acceptance. In this sense, those who execute network power coordinate social interaction in the networks according to rules for inclusion. *Networked power* is the relative power of social actors over other social actors in the same network; and the forms and processes of networked power are specific to each network. *Network-making power* is the power to program specific networks according to the interests and values of the programmers, and the ability to connect and ensure the cooperation of different networks, while defending the network from competition from other networks.

Programmers hold the power to program and reprogram networks; switchers hold the power to control the connecting points between networks. Crucially, within this formulation, people, collectives, and organizations are understood to be social actors who have the ability to disrupt the dominant power switches, and/or to push for change through what Castells calls “counterpower” (Castells 2007, 2009). Counterpower in the network society is exerted when social actors attempt to change the programs of specific networks or disrupt the switches that represent the dominant programmatic logic of the network.

In defining inclusion in this way, we acknowledge that we are setting the bar high by insisting that, in line with human potential paradigms, inclusiveness requires empowerment in the forms just described. Without inclusion culminating in those habitually excluded being in a position to negotiate different (and, hopefully, more equitable)

decision-making outcomes by disrupting existing network power arrangements, we see little by way of meaningful returns from access and participation for those typically excluded from governance processes. At the same time, we acknowledge that a fully inclusive society is a utopian ideal. As Castells (1999) contends, exclusion is a structural condition of the network society and openness can be limited to certain constituencies. Nevertheless, open data make new power arrangements possible by disrupting previously closed information flows and by democratizing the monitoring of powerful actors to enforce the maintenance of a balance between informational and human development. This discussion will consider whether and how open data disrupt the existing distribution of power, and whether they activate different forms of counterpower in networks to yield a more inclusive, synergistic development.

Methodology

The Open Data for Development (OD4D)³ initiative consists of a network of partners with the ambition of “empowering women and men around the world to achieve their own development goals and actively participate in decisions affecting their lives” (OD4D 2016, 44). OD4D has supported several initiatives to explore the connections between open data and development, with a particular focus on developing countries where the gaps between rich and poor, formal and informal economies, and skilled and unskilled are at their most acute.

A first round of analysis comprised an examination of OD4D projects that had formulated their own theory of change with regard to the inclusion of marginalized publics in decision-making as an outcome of the project.⁴ Projects were selected for analysis on the basis of the following criteria: (1) open data must have been published by the project or the project resulted in the use of existing open data; and (2) there were tangible, recorded outcomes that are attributable to the release or use of open government data. A total of fifteen projects were included in the analysis (see table 10.1).

Following the analysis of the OD4D projects, it was clear that many of the OD4D projects did not provide sufficient evidence to explore how, for whom, and in what contexts open data contribute to inclusive development. It was decided, therefore, to broaden the scope of the analysis by purposively selecting from the literature additional open data projects that would be informative in terms of an analysis of the relationship between open data and inclusion. A total of fourteen projects were selected based on the existence of reported outcomes and impacts, and the bearing of these on inclusion (see table 10.2).⁵

Table 10.1

OD4D projects included in the first round of analysis.

Name of project	Short description
A Tu Servicio (At Your Service)	A Tu Servicio is a web-based app that uses data from the Ministry of Health to compare health service providers by providing Uruguayan citizens with information on which to base their annual selection of a health service provider.
Respiraciudad.org	The project engaged three cities in Latin America (Buenos Aires, Mexico City, Montevideo) in the collection, curation, and publication of air quality data. It allowed the cities to understand the challenges of producing updated data in order to report on air quality in three urban centers.
Cuidando do meu bairro 2.0	Cuidando do meu bairro 2.0, whose name means “Caring for my neighborhood” in Portuguese, created tools so that communities could better understand the public budget and exercise the control and inspection of public expenditures in the city to promote action in city neighborhoods.
OD4Environment Gjakovo	Citizens of Gjakovo, Albania, reported that illegal dumps have a negative effect on health and tourism. A partnership among local youth, the Municipality of Gjakova, Open Data Kosovo, and UNDP’s Support to Anti-Corruption Efforts in Kosovo project led to the creation of the first heat map showing where 687 illegal dumps were located in the city. Local communities volunteered as data collectors.
Open budgets in Ukraine	Lviv, Ukraine, with a population of 730,000, publishes its annual \$178 million municipal-level budget and expenditure data using the Open Budget tool. The data allows citizens to monitor the income and expenditure of the city.
Budi Odgovoran Montenegro	Budi Odgovoran, which means “be responsible” in Croatian, is a mobile app that allows the citizens of Montenegro to report local problems such as illegal waste dumps, misuse of official vehicles and irregular parking, failure to comply with tax regulations, and failure to issue fiscal receipts.
RISE Moldova	RISE Moldova, a Chisinau-based nongovernmental organization, brought together journalists, programmers, and activists from Moldova and Romania. RISE promotes and uses investigative journalism to uncover corruption, the misuse of office, and conflicts of interest. Using government data, RISE has published several stories on corruption in Moldova. The app also supports other investigative journalists: In 2015, it organized a “hack-athon” and various workshops on data journalism, as well as training on data security.
Open procurement Kosovo	UNDP and Open Data Kosovo initiated a partnership that led to the opening of procurement databases in five municipalities in Kosovo. The databases covered three to five years, providing insights into local government spending

Table 10.1 (continued)

Name of project	Short description
Using open data to create transparent value chains in Rwanda	<p>and access to over 10,000 public tenders. The cleaning and visualization of data were done in each municipality, with engagement of the local developer communities that underwent digital capacity-building. In addition to visualizations and mapping, the tech activists developed algorithms that automatically detect suspicious tenders.</p> <p>African Minds brought together stakeholders in a coffee value chain to discuss what data they own, what data they would like to have, and what data they are prepared to make open. The project is interested in finding out whether open data can create a more transparent value chain that is beneficial to all stakeholders in the chain.</p>
Unlocking the value of open data through problem-focused subnational networks	<p>Palmer Development Group working with Open Data Durban, engaged the city of Durban, South Africa, and convened a range of stakeholders to resolve how open data might be used in managing the city's water resources. The project was interested in discovering how a networked, problem-focused approach could unlock the value of open data at the local level.</p>
Disrupting illicit financial flows in the extractives industry	<p>African Network of Centre for Investigative Reporting supported journalists across Africa to investigate corruption in their respective countries. The project was interested in finding out how open data contribute to the work of investigative journalists as they compile the evidence that supports their stories.</p>
Linking follow the money initiatives for better transparency	<p>The Center for Local and Regional Governance explored how open data can link follow-the-money communities together, particularly at the local level. This entailed mapping fiscal data requirements and producing an open data model for fiscal transparency and accountability. This was done by documenting four cases of CSOs that audit or participate actively in budgeting and auditing processes at the local level.</p>
Exploring political interest and asset ownership	<p>Using international data standards, the Sinar Project built a sophisticated public visualization tool to explore political networks, conflicts of interest, and voting behavior of public servants in Malaysia.</p>
Making smart city initiatives open and inclusive	<p>The Center for Innovation Policy and Governance analyzed and assessed smart city initiatives in Jakarta, Indonesia, to see how these involve and benefit citizens.</p>
Open data and interactive community mapping: Empowering local community tourism in Jamaica	<p>This initiative employed partnerships with community organizations, government agencies, local businesses, and academia for the development of an interactive community-mapping ecosystem that provided the basis for community tourism activities. Interactive community mapping was employed for the creation of a community map as open geodata using the OpenStreetMap platform.</p>

Table 10.2

Open data projects and outcomes analyzed.

Name of project	Short description
Esoko—Ghana	Smallholder farmers generate much of Ghana’s agricultural production. However, they have only limited access to important information that underlies increasingly complex global food chains, and this prevents them from fully maximizing the value of their crops. Esoko, a company operating in Ghana, sought to address this problem by using multiple data sources, including open government data, to permit farmers to secure better prices for their produce and level the playing field in price negotiations between farmers and buyers.
Medicine Price Registry (MPR)—South Africa	In 2014, Code for South Africa took a little-known open data set from the national Department of Health website and created the Medicine Price Registry (MPR) app, an online tool that allows patients to compare medicine prices. The app allows patients to compare the costs of doctor-prescribed medicines with those of other medicines (e.g., generics) containing the same ingredients. It also helps patients verify that they are not being overcharged by their pharmacies and ensures cost savings for both patients and society without compromising on efficacy.
Open Education Dashboards—Tanzania	The Tanzanian public’s knowledge of public school performance was limited by a lack of information about the country’s primary and secondary education sectors. Two portals tried to remedy that situation, providing the public with more data on examination pass rates and other information related to school quality: <ul style="list-style-type: none"> • The Education Open Data Dashboard: A project established by the Tanzania Open Data Initiative, a government program supported by the World Bank and the UK’s Department for International Development to support open data publication, accessibility, and use. • Shule: Developed by Arnold Minde, a programmer, entrepreneur, and open data enthusiast.
GotToVote—Kenya	In the lead-up to Kenya’s 2013 general election, the country’s Independent Electoral and Boundaries Commission (IEBC) released information about polling center locations on its website. The information, however, was difficult to access. Code for Kenya, a governance innovation initiative, scraped ⁶ the IEBC data and built a simple website where information could be more easily accessed. The result was the initial version of GotToVote, a website that provided citizens with voter registration center information and helped them navigate the complex registration procedures.
Predicting dengue fever outbreaks in Paraguay	Dengue fever has been endemic in Paraguay since 2009. Recognizing that the problem was being compounded by the lack of a strong system for communicating dengue-related dangers to the public, the National Health Surveillance Department published open data on dengue morbidity.

Table 10.2 (continued)

Name of project	Short description
A Tu Servicio—Uruguay	<p>Leveraging this data, researchers created an early warning system that can detect outbreaks of dengue fever a week in advance. The data-driven model can predict dengue outbreaks, so long as data on morbidity, climate, and water are available.</p> <p>A Tu Servicio, a web-based app, uses data from the Ministry of Health in Uruguay to compare—and improve—care standards offered by health service providers. Uruguayans select a new service provide at the beginning of every year.</p>
Bhoomi Program—Bangalore, India	<p>The Bhoomi Program (promoted by the government of the Indian state of Karnataka) digitized and made public 20 million land records in Bangalore (India). The initiative was considered a best practice model of e-governance, to be replicated in other parts of India and elsewhere in poor countries.</p>
Burkina Faso elections	<p>In 2015, Burkina Faso held its first truly free, open, and transparent democratic presidential election. Planning and delivering a democratic election in Burkina Faso raised numerous challenges for the Commission Électorale Nationale Indépendante (CENI). The main challenges were to build trust in the election and to prevent a prolonged period of uncertainty about the results. In overcoming these challenges, CENI worked to secure political buy-in for the rapid processing and publication of verified election results. They committed to a turnaround time that would be unprecedented in Burkina Faso: just one day. Through a results transmission system and web app, along with media sources that had been briefed in advance, results information was made accessible to citizens and interested parties. The winner of the election was announced a little over twenty-four hours after the polls closed, and the result was accepted by the losing candidates.</p>
Open Development Cambodia	<p>Cambodia has shown impressive improvements in political, economic, and social conditions over the last ten years. The country has managed to end civil war, grow the economy, and improve health and education outcomes. Despite this, there are underlying weaknesses in Cambodia's political institutions that constrain its development. These include a growing opacity in decision-making and a lack of information regarding development efforts sweeping across the country. Open Development Cambodia (ODC) was born out of a desire to address these issues. Its goal is to provide access to current and historical information about Cambodia's development via an open data platform compiling data from a wide range of public sources. Launched in 2011, ODC's online portal provides information to government, civil society, media, and the public sector.</p>

(continued)

Table 10.2 (continued)

Name of project	Short description
Electricity Supply Monitoring Initiative (ESMI)—India	<p>Across the developing world, roughly 1.2 billion people do not have access to electricity. Of this number, at least 30 percent live in India. In addition, at least 247 million people experience irregular access to electricity, with many receiving only around four hours a day. While the Ministry of Power and the Central Electricity Authority have released several data sets on electricity service provision on the national open data portal, these relate to power generation, supply and demand, and tariffs—all useful information, but not about power quality. In 2007, the Prayas Energy Group (PEG), an Indian NGO, launched the Electricity Supply Monitoring Initiative (ESMI) to collect real-time power quality information by installing Electricity Supply Monitors (ESMs) in various locations. With a Google grant, it expanded to 200 locations in eighteen Indian states across the country. The initiative was able to make power supply–monitoring data available for different users across the country, to make people aware of the state of electricity supply, advocate for better service provision, and influence policy at both the state and country levels.</p>
iParticipate—Uganda	<p>In 2011, the Collaboration on International ICT Policy for East and Southern Africa (CIPESA) began promoting the use of ICT in monitoring good governance and service delivery in Uganda funded by the Swedish Program for ICT in Developing Regions (SPIDER). Building on the experience and networks developed by CIPESA through this project, iParticipate, a project funded by SPIDER in 2013, was designed to leverage open government data as an enabler of citizen participation and accountable governance. CIPESA used open data available from government portals and from other sources to analyze health service delivery and public investments in health. Mapped data of health providers was compared against the budgetary allocations to the subcounties for the health sector. The maps illustrated that areas with large populations had limited facilities for public health, while some areas received limited funding aimed at improving public health facilities.</p>
Mining governance in Indonesia	<p>Gerak Aceh, an anticorruption advocacy group in Banda Aceh, Indonesia, used open data to influence provincial mining policy. Gerak Aceh worked with the provincial information officers of Aceh province to convince the provincial government agencies to disclose mining-related information. Because of several challenges in working with provincial mining officials, the group took on the task of proactively disclosing mining data through its own portal. It then trained CSOs to use the open data and came up with analysis and visualizations of tax payments; outstanding payments of mining companies to governments; and permit issuance, among other functions. The outputs of the training were used to educate other organizations on the need for a moratorium on the issue of mining permits to be extended to allow reforms in mining governance. It also organized rallies to put pressure on the</p>

Table 10.2 (continued)

Name of project	Short description
Public sanitation in Chennai, India	<p>provincial government to extend the moratorium. Gerak Aceh, in collaboration with other actors, was able to convince the provincial government to extend the moratorium. Data-based advocacy was the main factor in this victory, as Gerak Aceh and its partners were able to show through the data they gathered and analyzed that the provincial government still needs to do more through reforms before considering issuing more permits.</p> <p>Transparent Chennai is an action-research group that uses data to improve urban governance in Chennai. In the course of their research, they observed several problems with the way government data is stored and shared with citizens. Transparent Chennai obtained data that do not have geospatial information, timelines, and administrative and sectoral boundaries, all of which have proved to be barriers to their use. Consequently, Transparent Chennai collected data sets with each of these aspects and processed them to improve their quality. For instance, they obtained lists of public toilets and mapped their physical locations. Its researchers also collected data on whether these toilets were functional according to some simple parameters: whether there was water, lights, and doors, and if they were clean. It then made interactive maps that overlay administrative boundaries with a layer of the location of public toilets and information on whether they are usable.</p>
Disaster relief in Nepal (Kathmandu Living Labs' Quakemap and other initiatives)	<p>After two devastating earthquakes in 2015, Nepal faced a lengthy and costly relief effort and recovery. Nepali open data activists sought ways to crowdsource and deploy open data to identify the most urgent needs of citizens, target relief efforts most effectively, and ensure that aid money reached those in need. A number of initiatives created postquake maps that were used by relief agencies, alerted rescuers to Nepalis in need of urgent assistance, provided opportunities for citizens to share feedback on the recovery with government, and ensured fiscal accountability for aid. One of the initiatives implemented was that of Kathmandu Living Labs, which mapped the areas affected by the earthquake and was used by search and rescue teams, via a website called Quakemap, where users could articulate their needs to responders, and coordinate relief and emergency response efforts.</p>

Our approach in analyzing the fourteen projects was to develop an analytical framework. This framework was based on the proposition that for open data's contribution to inclusion to be meaningful in the sense that it supports equitable development, it should (1) take into account both the processes and outcomes of the supply and use of open data, (2) incorporate an appreciation of the networked nature of society, and (3) be placed within the context-specific distribution of power in the network society. To analyze these projects in a methodical and systematic manner according to these propositions, the following questions were developed to guide the analysis of each project:

- To what extent is social inclusion a stated objective of the project?
- How is access to data or information changed because of the publication of open data?
- What evidence exists regarding the result of open data on the type and level of participation of communities in a decision-making process?
- To what extent was the outcome of access and participation beneficial to habitually excluded groups?
- What were the contextual factors that resulted in an increase in the inclusion or exclusion of marginalized individuals or groups?

From the data collected on the processes, outcomes, and contextual factors of the projects, a set of conditioning factors was developed to capture what emerged from the projects as possible determinants of the observed outcomes in relation to open data and inclusion. The factors were developed by analyzing a random selection of eight projects before being stress tested and refined by an analysis of the remaining six projects in the sample.

Findings and Discussion

Open Data Project Outcomes and Inclusion

In most of the fifteen OD4D cases examined, we found that there is insufficient data on the outcomes and impacts of the projects to make conclusive statements about open data's role in including marginalized groups. In some instances, the interventions designed by projects were no longer active or in use at the time the research was being conducted (e.g., open procurement in Kosovo; reporting illegal dumping in Gjakovo, Albania; and air quality data in three Latin American cities), suggesting that these projects could not have had any sustained impact in terms of inclusion.

In other cases, we found evidence of an increase in the number of users of the information made available. For example, in the case of *A Tu Servicio*, an app that provides information on healthcare service providers in Uruguay, there was an increase in users

from 30,000 (1% of the population) to 60,000 in its second year of operation. In the case of open budgeting information published by the city of Lviv in the Ukraine, there is evidence of 116,273 data downloads. But the number of hits, downloads, or users recorded reveals little about the demographics of those users—whether their composition reflects existing socioeconomic stratification in a particular country or region, or whether the composition of users is more diverse, providing previously excluded communities access to information that may yield new benefits for them through more informed decision-making. Neither do these kinds of data reveal any insights on how the lives of those users were changed.

This finding draws attention to a fundamental challenge for open data: how to measure and track the use of open data in such a way so as to be able to make robust claims about both their use and usefulness as a driver of change. As Janssen et al. (2012, 258) point out, “A conceptually simplistic view is often adopted with regard to open data, one which automatically correlates the publicizing of data with use and benefits.” This is borne out in some of the cases analyzed where measurement terminates at data provision, regardless of whether the data were used. In the open procurement initiative in Kosovo, for example, success measurement stops at the number of data sets made publicly available. In the case of A Tu Servicio in Uruguay, the number of users of the app is used as a metric, while Budi Odgovoran in Montenegro uses the number of reports filed and the use of that data to issue fines.

If inclusion is a valued indicator of success, then funders of open data initiatives and designers of open data projects should take seriously the development of metrics that provide insights into the outcomes of data use, including the extent to which marginalized communities were among those who benefited from the intervention.

If we use, as an analytical lens, participation of marginalized groups in open data initiatives implemented by OD4D partners, then we find that the roles of marginalized groups in most of the projects are confined to informants, trainees, and beneficiaries—who are only consulted in some of the cases. As such, they may benefit from an intervention but are not necessarily involved in shaping them. This lack of attention to how marginalized groups participate in the design, implementation, or monitoring of these initiatives is viewed as an outcome rather than as a process. Had inclusion been incorporated as a process in the OD4D framework, reporting may have been more explicit in clarifying the roles of the marginalized in the life cycle of OD4D projects.

A project that was purposeful in its design in terms of the inclusion of marginalized people was the open data project in São Paulo, Brazil, called *Cuidando do meu bairro* (Caring for My Neighborhood). It sought to make online tools available so that citizens in marginalized city districts could better understand the public budget and exercise

control and inspection of public expenditure in the city to promote action in their neighborhoods. The project came to the realization, however, that despite high levels of interest in using open budget data to monitor the city government, the enthusiasm of the diverse group of citizens who gathered in poor and often excluded parts of the city was thwarted by a lack of internet connectivity.

The São Paulo example illustrates that access to data, as well as the technical and cognitive skills combined with the domain expertise needed to interpret data to create meaning (Zuiderwijk et al. 2012), will often limit the possibility of the most vulnerable and marginalized to participate in or influence decisions that affect them. This is a major challenge for open data. Johnson (2014) points out that the open data community fails to understand the constructed nature of data, leading to three problems, one of which is the differential capabilities of data users. Others point to the contributions of intermediaries in bridging capability gaps to catalyze the flow and use of open data (Schrock and Shaffer 2017; van Schalkwyk et al. 2015).

A way in which OD4D projects were found to be more inclusive is through their convening effect. In other words, while the OD4D projects were not inclusive in their design, they do appear in their execution to convene a diverse and more inclusive range of stakeholders. An open mapping project in Kingston, Jamaica, brought together a range of stakeholders that, importantly, included representatives from a marginalized community in the city. Similarly, the Using Open Data to Create Transparent Value Chains in the Rwanda project convened multiple stakeholders (coffee producers, importers, roasters and retailers, as well as specialists in technology, agronomy, and research) who are not in the habit of interacting or sharing information to explore more transparent value chains in the coffee sector. The Health and Open Data project in Uruguay and the Unlocking the Value of Open Data through Problem-focused Sub-national Networks project in South Africa may not have been as inclusive in their convening of only civil society organizations (CSOs) and governments, but they nevertheless brought together stakeholders who had traditionally been in an adversarial rather than a cooperative relationship.

In many cases, a clear problem focus was evident. These projects positioned themselves less as open data projects and more as problem-specific projects interested in how open data could be deployed to solve the problem. A project in Kosovo focused on environmental health brought together local youth, community volunteers, the municipality, an open data CSO, and a United Nations Development Programme (UNDP) initiative to create a heat map of 687 illegal dumps in the city. In Malaysia, a project focused on corruption in the public sector created detailed profiles of elected officials using open data and resulted in the bringing together of various partners in

Malaysia (academia, CSOs, hackers, and even government officials) and, unexpectedly, partners from the technology community in Myanmar. While these projects did not result in the publication or use of open data, they did introduce a greater diversity of stakeholders into discussions of how open data can be used to solve social problems.

Whether more inclusive design or the convening of a more diverse group of stakeholders results in greater benefits for the habitually excluded remains unclear. Bringing the programmers and switchers of different networks together or creating spaces for locally excluded communities to connect to global networks may be a step forward, but it also may nevertheless reinforce exclusion or the entrenchment of existing power structures, as would be apparent from the outcomes and impacts of open data initiatives. It is to these outcomes and impacts that we now turn our attention.

Factors Affecting the Relationship between Open Data and Inclusion From a synthesis of the outcomes across the fourteen open data initiatives, a set of factors that condition the relationship between open data and inclusion was identified. These factors include the disruption of existing data flows, opportune niches and the interventions of intermediaries, and value creation and transfer. Each of these conditioning factors is explained and discussed in the sections that follow, with reference to the relevant cases.

It should be noted that the order in which the conditioning factors are presented should not be interpreted as indicating a linear or cumulative progression of factors. Neither are they a sequence of temporally dependent steps. For some of the factors, progression is implicit. For example, an opportune niche must be present before it can be occupied, and value transfer can take place only once value exists. However, it is also possible for value transfer to take place following disruption if the data already hold sufficient value for specific networks. We see the conditioning factors as a set of interlinked factors or conditions determined by the networked nature of society; some factors may occur in series, while others occur in parallel.

Disruption of Data Flows In all cases, we found open data to be a disruptor in the flow of data in one way or another, to varying degrees, and in both positive and negative ways. By implication, therefore, open data have the potential to change the distribution of power within information networks by making new flows of data in and between networks possible. If we use as a starting point the assumption that power is concentrated in certain nodes in networks and that data are a fundamental resource for social actors in establishing and protecting central nodes in the global network society, then the disruption of information flows is triggered by the release of open data that have currency in a particular network and are accessible and reusable by all actors in the network. This

is not to say that all open data will disrupt existing flows in networks—but rather that their disruptive property is a factor of their openness and their currency.

It is important to be specific about the type of value that confers currency to data. For open data to be disruptive, they need to be of value to those social actors that occupy the central nodes of power in networks. If this is the case, noncentral nodes, and potentially those outside a network, will be in a position to use data to challenge the program of the network.

Several cases illustrate this point. The Department of Health in South Africa publishes data on medicine prices—data that are highly valuable to pharmaceutical companies in protecting their positions of power in a network programmed according to a capitalist market logic. An entrepreneur and a government agency in Tanzania with the support of a supranational institution make data on secondary-school pass rates available. These data are valuable to the ruling political elite in protecting their central position in a network programed to ensure its continued rule by meeting the expectations and needs of the majority of the electorate. Kathmandu Living Labs collects and publishes geolocation data that becomes valuable to a network of disaster relief agencies in postquake Nepal programmed according to logics of transparency and effectiveness. In Paraguay, the release of disease outbreak and morbidity data by the *Dirección General de Vigilancia de la Salud* (National Health Surveillance Department of Paraguay) is valuable to the political networks of the country, as well as to the network of supranational health agencies, each with a different programmatic logic (i.e., retaining political power versus equitable access to healthcare). In all cases, the data are disruptive because of their value to the network and they are made publicly available for other global networks and local communities to use.

The relevance of the value of open data in relation to specific programs of networks is perhaps most telling in the case of the Bhoomi Program in India (Benjamin et al. 2007). The government of the Indian state of Karnataka digitized and made public 20 million land records in Bangalore. In this case, the intended outcome was for the data to be of value to rural farmers who require title-deed data to apply for financial loans. However, as it turned out, the data were of value to surplus-seeking actors in the global financial network that were able to use the data to acquire land by various methods, and, in so doing, expel farmers from the local agricultural network and further entrench their own positions of power in financial networks.

The Bhoomi Program also illustrates that disruption is triggered in the first instance by data, not by nondigitized information. With the digitization of those records, lawyers, brokers, and financial experts who had previously relied on paper records gained immediate access to the raw land records data and could, by virtue of their expert knowledge, extract value from the information. Farmers, in contrast, were dependent

on intermediaries to translate the raw data into usable information, and on information kiosks to access that information. Globally networked actors with the requisite skill sets and knowledge could act more rapidly, and thus exclude the intended beneficiaries. It is only when other factors activate opportune niches—the creation of value for marginalized communities by intermediaries and the transfer of value back into global networks as discussed later in this chapter—that information, as “data that have been organized and communicated” (Porat 1977, 2), also assumes its disruptive potential.

Who the publishers or communicators of open data are, and what type of data is published, were also observed to be relevant to the disruptive potential of open data. In nongovernmental institutional settings, such as private research labs and universities, funding agencies are disrupting the flow of scientific data by requiring grantees to make the research data publicly available. In five of the cases examined in this study, open data were published by nongovernment actors. In the cases of GotToVote in Kenya and the elections in Burkina Faso, it was the independent election oversight body that published the relevant open data. In both Nepal and Cambodia, it was a civil society–based organization that collected and published open map data, while in Banda Aceh, Indonesia, it was a CSO that published open government data, even though the data were collected by government. In only three cases were the open data published comprised exclusively of open government data.

In most of the cases, open government data was combined with other data, which included open and closed data, sometimes crowdsourced and sometimes from nongovernmental sources, to disrupt the flow of data in a network. For example, in India, open government data on electricity supply was supplemented by crowdsourced data on the quality of the supply for it to be disruptive. In Indonesia, provincial information officers of Aceh province and a CSO (Gerak Aceh) worked together, along with the national government, to make mining data available to the CSO so it could publish the data on its portal. In these cases, government acted cooperatively with nongovernmental actors.

There were instances in which government agencies attempted to prevent disruptive open data flows, possibly indicating attempts by network programmers or switchers to protect existing flows from being disrupted. In the case of Cambodia, certain government agencies failed to publish open data such as environmental impact assessment data, despite legal requirements for them to do so. Open Data Cambodia resorted to scraping and publishing the data as open data on its own portal. In Tanzania, a project that relied on data scraped from Portable Document Format (PDF) files on a government agency’s website, received no support when requests were made to government for the data to be published in open formats, which ultimately scuppered the publication of open examination results data.

These cases illustrate that open data have the potential to disrupt network information flows because it is universally accessible, but that disruption takes place in those networks only where the data have currency. Disruption is limited in some instances by the fact that while access is universal, usability is not. Open data may have to be converted to information or delivered by supplementary channels for the data to be of use to the intended beneficiaries, including to those who are habitually excluded. Moreover, further limits may be brought into play if there is an absence of suitably connected and able actors who can achieve the conversion from data to information. The lag from open data that are of value to selected globally connected networks to information that is of value to those typically outside of networks may further exclude, as network programmers or switchers use open data to protect their positions. Nevertheless, once open data have been translated into usable information, they may still be deployed to challenge the programs of dominant networks. How this process plays out is explored in more detail in the following sections on opportune niches, intermediaries, and value creation and transfer.

Opportune Niches and Intermediaries The disruption of flows does not take place in a vacuum, but rather in a particular social and environmental context, each with a unique configuration of networked capabilities, resources, and power. Disruption of data flows in networks as described in the previous section may take place in contexts that create spaces, or *opportune niches*, that attract new social actors to networks. In a study of opportune niches in an open data ecosystem, Andrason and van Schalkwyk (2017, 11) suggest that a “niche emerges at the point where the data users, the data source, and resource owners intersect.”⁷ While an intersection is located within ecosystems in the Andrason and van Schalkwyk study, intersections also form part of networks, with dense convergences creating network nodes.

Not all opportune niches present equal opportunities. While open data imply universal access, access to opportune niches is not universal and depends in part on the configurations of material and nonmaterial capitals of social actors (van Schalkwyk et al. 2016). The advantage for some actors over others to enter a niche will depend both on their capitals and on the nature of the niche itself. In sum, the ability of actors to enter into or reposition themselves close to emerging niches in networks will depend on their constellations of capital, the situated material and nonmaterial advantages that they bring to the network or to those who occupy central nodes (Andrason and van Schalkwyk 2017; Castells 2009, 2017).

The importance of specific properties required by social actors to exploit opportune niches, and their effects once they establish themselves, point to the difference between those who are able to exploit opportune niches and those who cannot. Here,

social actors located between those who occupy positions of power and those who are excluded from networks come into focus: namely, open data intermediaries (van Schalkwyk et al. 2015, 2016).

An *open data intermediary* is any social actor positioned at some point in a data supply chain that incorporates an open data set, positioned between two actors in the supply chain, and facilitates the use of open data that otherwise may not have been the case (van Schalkwyk et al. 2016). What is relevant in the definition to this analysis is the propensity of intermediaries to make possible new connections. Andrason and van Schalkwyk (2017, 17), in the following comment, discuss these possibilities:

Each intermediary deploys the forms of the capital differently to connect...successfully. No intermediary necessarily has all the types of capital at their highest possible (notional) extents. Rather, intermediaries excel in some forms of capital (or even it sub-types of such forms) while the extent of other forms may be deficient...[T]hey are not only conditioned by their environment's structure and properties...but also actively modify the hosting milieu, as far as its configuration and characteristics are concerned. Overall, the intermediaries improve connectivity between the various agents in the ecosystem.

Intermediaries, due to their different constellations of capitals compared to that of excluded communities, are either established in networks or are able to access the opportune niches that emerge due to changes in the network's environment.

Opportune niches were noted in many of the cases (see table 10.3). In each of these cases, the niche in a particular network presented itself as a social problem and was exploitable by social actors because of (1) a simultaneous opportunity or enabling conditions that created a demand for data, (2) the availability of relevant open data, and (3) their particular constellation of capitals, the value and relevance of which are determined by the network in which the problem presents itself.

Social actors may predict the emergence of opportune niches. In the case of Gerak Aceh in Indonesia, the imminent expiry of a moratorium on the issuing of mining licenses was used to create an opportune niche. An Indonesian CSO negotiated with the government of Aceh to release data on mining in the province, which they used to mobilize other social actors effectively, drawing them into the network to apply collective pressure on the provincial government to extend the moratorium.

Opportune niches may emerge spontaneously, and they can disappear just as rapidly. Kathmandu Living Labs had been collecting and publishing open data for some time before the earthquake, but they remained largely unused. However, when the earthquake struck and information was needed to assist in the management of disaster relief efforts, the publicly available data were used by those coordinating the relief efforts. In other words, the earthquake created an unpredicted, spontaneous opportune

Table 10.3
Opportune niches in networks.

Actor	Product	Problem	Enabling conditions/ demand for data	Open data	Capitals	Connections
Esoko	Information service	Illiterate farmers. Smallholder farmers unable to benefit from globalizing food chains.	Affordable and widespread mobile network. Inefficiencies of agricultural extension officers. Development funding.	Ministry of Agriculture, Government of Ghana US third-party provider	Economic ✓ Social ✓ Cultural ✓ Technical ✓ Symbolic ✓	Farming community Funding agencies National government
Code for South Africa	MPR	Lack of transparency and consistency in medicine pricing.	Increasing cost of healthcare. Expensive medicines. Computerization of surgeries. Attentive health ministry.	MPR, Ministry of Health	Cultural Technical ✓ Symbolic ✓	None
Tanzania Open Data Initiative	Open Education Dashboard	Lack of accountability for school performance. Lack of informed choices possible on the part of parents.	Poor examination results due to changes in the Tanzanian education system. Exposure of problem in the media. Mounting political pressure. Increase in interest in Tanzania by donors.	Examination pass rates, National Examination Council of Tanzania (NECTA) National Bureau of Statistics	Economic ✓ Cultural Technical ✓	Government Supranational funding agencies
Arnold Minde	Shule	Same as for Tanzania Open Data Initiative	Same as for Tanzania Open Data Initiative	Same as for Tanzania Open Data Initiative	Cultural Technical ✓	CSO
Code for Kenya	GofToVote	Limited access to information by the voting public.	Prior election chaos. New electoral process and constitution. Affordable and widespread mobile network.	Independent Electoral Commission, Kenya	Social ✓ Cultural ✓ Technical ✓	Oversight agency

Latin American Open Data Initiative (ILDA)	Predicting dengue fever outbreaks in Paraguay	Dengue fever endemic in Paraguay since 2009. Problem compounded by the lack of a system for communicating dengue-related dangers to the public.	173,000 probable cases of dengue in the year 2016, with 48 cases of severe dengue and 16 deaths. Increased concern about other mosquito-borne diseases such as malaria, chikungunya, and Zika.	Dengue morbidity data, National Health Surveillance Department of Paraguay. Meteorological data, third party.	Cultural ✓ Technical ✓ Symbolic	Supranational funding agency
DATA Uruguay and Ministry of Health	A Tu Servicio	Lack of transparency and accountability of health service providers. Healthcare data not available in a format that allows citizens to make informed decisions. Additionally, the pressures from competing health providers led citizens to rely on marketing and advertising campaigns based on opinion rather than actual data.	Near-universal coverage of publicly funded healthcare provisions. February in Uruguay: public debate over the factors that influence citizens to choose (or leave) a health service provider; marked by heavy advertising on the part of providers, many of whom encourage citizens to join them and leave others and may even pay users to switch providers. Attentive health ministry.	Health service provider data, Ministry of Health.	Economic ✓ Social ✓ Cultural ✓ Technical ✓	Government Civil society
State of Karnataka, India	Bhoomi Program	Lack of access to land record data needed by farmers to secure loans.	Digitization of land records. Escalating land prices in Bangalore. Low levels of efficiency and high levels of corruption.	Land records data, State of Karnataka.	Economic ✓ Social ✓ Cultural ✓ Technical ✓	None

(continued)

Table 10.3 (continued)

Actor	Product	Problem	Enabling conditions/ demand for data	Open data	Capitals	Connections
Burkina Faso Open Data Initiative (BODI)	Burkina Faso election results	Low levels of trust in the electoral process, and trust needed to ensure postelection political stability.	Unstable and dictatorial political past means increased attention and interest in the elections. Interest from international open data community.	Election results data, CENI.	Economic ✓ Cultural ✓ Technical ✓	Government Oversight agency Supranational agencies International open data experts
Open Development Cambodia	Open data portal	Lack of access to natural resource data, including information related to agriculture which is one of Cambodia's key industries.	The failure of the Cambodian government to provide important country assets provided a role for ODC to fill. ODC had numerous requests in the past to get data on soil type published on its portal and was able to do so. This data were used by the Cambodian Rice Federation to determine potential growth areas in crop production.	Multiple sources, including scraped from government websites.	Social ✓ Cultural ✓ Technical ✓	Media Private sector
Prayas Energy Group	ESMI	Poor quality of electricity supply and lack of data on the quality of electricity supply.	The unequal access to quality electricity in India, where, for example, rural areas experience 500% more interruptions than district and urban centers. Interest from media and the funder (Google).	ESMs in various locations. Government data (Ministry of Power and the Central Electricity Authority).	Social ✓ Cultural ✓ Technical ✓	Government Regulators Media Civil society Private firms

CIPESA	iParticipate	Unclear; need for reforms in the healthcare sector?	Unclear: Funder-driven? Poor governance of health sector?	Open data on government portal.	Social ✓ Cultural ✓ Technical ✓	NGOs Media Donor funders
Gerak Aceh	Open data portal	Unaccountable mining companies, corruption, and adverse effects on local communities and their environment.	Lack of transparency and corruption in the mining sector in a province of Indonesia. A moratorium on the issuing of mining licenses expired in September 2016. This was seized on as an important moment for advocacy by the organization.	Provincial Mining and Energy Department and the local transportation, information, and communications agency.	Economic Social ✓ Cultural ✓ Technical ✓ Symbolic ✓	NGOs Local communities
Transparent Chennai	Enriched data on public facilities in Chennai	Health issues in Chennai's slums as a result of poor sanitation facilities.	Chennai's poor reputation as a city. Poor state of the public facilities as a result of the lack of consultation and grounding of public spending priorities. Government willingness to listen and accommodate the suggestions on data collection and quality.	Various municipal government sources. Data collected by Transparent Chennai to supplement government data.	Social ✓ Cultural ✓ Technical ✓	Local government
Kathmandu Living Labs	Quakemap	Lack of reliable data with which to plan and coordinate disaster relief and rescue efforts. Lack of accountability around the distribution of aid.	Earthquakes in Nepal. Attentive media and disaster relief network.	Crowdsourced data. Official statistical data.	Social ✓ Cultural ✓ Technical ✓	Disaster relief community Local communities

niche in the network of globally connected aid agencies that allowed Kathmandu Living Labs to enter the network of global relief agencies.

In some of these cases, opportune niches appear to be connected to powerful network nodes, while in others, this was not so. To illustrate, in the cases of Esoko, A Tu Servicio, Burkina Faso, Kenya, Bangalore, Gerak Aceh, Chennai, and electricity quality in India, social actors were connected to nodes of power (e.g., a government department or an independent oversight agency). On the other hand, in the cases of MPR, Dengue, iParticipate, Shule, and Open Development Cambodia, connections to power nodes were absent. While the absence of a connection between a powerful node and other social actors occupying an opportune niche does not prevent the addition of value to open data (as discussed next), the lack of a connection to a powerful node may account for why the latter group is more likely to fall short when it comes to transferring the value of the information across networks and, ultimately, to lower success rates in terms of inclusion. Similarly, those social actors without economic capital (e.g., Shule and Transparent Chennai) have not been able to maintain their position in the niche, and consequently are also unable to make a sustainable transformative contribution (see chapter 11 in this volume for more on the importance of government involvement in local, bottom-up open data initiatives).

What this section highlights is that opportune niches may be created by the simultaneous occurrence of opportunities in the environment and by the publication of open data. Opportune niches open up spaces in networks for intermediaries to occupy. Open data intermediaries are able to occupy and settle into niches if they possess the appropriate mix of capital that enables them to connect to existing actors in the network. Furthermore, once established, open data intermediaries make possible new connections between actors and resources within and between networks. Unresolved, however, is the question of whose interests open data intermediaries represent. Open data may have contributed to creating an opportune niche, but it is not yet apparent how open data contribute to a reprogramming of dominant networks in the interest of those excluded from networks.

Value Creation and Transfer According to Castells (2009, 27), “value is what the dominant institutions of society decide it to be.” In the network society, what constitutes value depends on the network and its program (or dominant logic) that is specific to each network (Castells 1996, 2009). In this sense, value is an expression of power, as those that have the power to program (or reprogram) the goals of the network determine what is of value to a specific network.

Janssen et al. (2012) say, “The main challenge is that open data has no value in itself; it only becomes valuable when used.” In this sense, the use of open data is a proxy for their value in a network.

Converting data into usable information is the primary task of a particular type of intermediary: the infomediary (Fung et al. 2010; Pollock 2011; Chan et al. 2016). *Infomediaries* typically add value to open data by reinterpreting, mixing, or repackaging them. By doing so, they render the data more comprehensible, usable, and attractive, and this is in both senses of the word, to other actors in a network who typically share common programmatic objectives.

The case of Shule, one of the Open Education Dashboard projects in Tanzania, reveals evidence of a mismatch between the value created by open data and the needs of the intended users. The project scraped school examinations results data and made it available on a website, along with visualization and comparison tools. It also partnered with a CSO that is active in education to promote the use of the data by the parents of secondary school children. However, the project eventually came to an end when it became clear that the data were not being used. An interview with the project lead revealed that his initial intention was to supplement the exam pass data with more basic data on Tanzanian schools such as their addresses, contact numbers, facilities, admission policies, and the like. He felt that parents would find the basic information more useful, and his hope was that the basic information would attract users to the platform, creating an opportunity to expose them to the school performance data. However, he lacked the resources to collect and maintain the basic data on Tanzanian schools, and the data on school performance remained unused by parents.

Interestingly, the only real uptake was over a short period by the international media, which reported on the successful use of open data in Tanzania. The portal was of greater value to the global media network than it was to the local community of parents. In other words, open data did not create any value for the intended users who did not use them, but they did create unintended value for the global media.

Altering the value of data by converting them into usable information was found in most of these cases, where the intention was to create value for a group or groups of users identified by those who designed the project or intervention. In the case of Esoko, value was added to market price data by making it available in simple formats in multiple local languages via cell phones, and also by providing local-language call center support to smallholder farmers in Ghana. In South Africa, Code for South Africa added value to government data on the breakdown of medicine prices by publishing information via an online app in the form of comparable, single exit prices for patients. A Tu Servicio in Uruguay developed simple indicators from government health data, making it possible for citizens to compare health service providers. The project to prevent dengue fever in Paraguay combined government and other open data, such as meteorological data, to create a tool to predict outbreaks of dengue fever. In all these cases, there is evidence of use by the intended users.

The key question in terms inclusion and of value creation is for whom the value is being created. Adding value to data by converting them into usable information has the potential to attract new users to the network, such that they participate in the politics of decision-making, or to activate existing network actors to challenge the dominant logic of the network. If the locus of decision-making (i.e., central nodes of power) is located in a different network from the one in which the value was created, then the value created in one network, by intermediaries or other actors, for a specific group of users must be transferrable to the network in which power is vested in order for it to have an impact that challenges existing power relations. Yet the network in which decision-making is located likely may not share the same programmatic logic as the network in which the value was created. Recalling the definition of *value*, which is what the network determines it to be (Castells 2009), it is only when value is shared that transfer can occur.

If there is shared value, that value must be transferred by someone or something from one network to another. Switchers connect networks and allow value transfer. Switchers are powerful actors in networks because they have the “ability to connect and ensure the cooperation of different networks by sharing common goals and combining resources” (Castells 2009, 45). If a value is shared or if there are no switchers in place, then networks remain disconnected. We found the inability of the open data initiatives in the sample to connect the value of open data between or across networks to be the most significant reason hampering the potential contribution of open data to greater social inclusion. In particular, switching between development aid networks, the open data movement, and government networks where decisions on the distribution of public resources are concentrated was lacking.

The cases from Indonesia, Paraguay, and Uruguay best illustrate value transfer as a factor in the relationship between open data and inclusion. In the case of Gerak Aceh in Indonesia, new social actors were drawn into an opportune niche where various actors formed a collective advocating for reform in the governance of mining in the province. The inclusion of new social actors increased Gerak Aceh’s ability to switch between networks (i.e., between a civil society network and a political one). This happened because Gerak Aceh was able to take advantage of networks and relationships within the provincial government, and, by mobilizing sufficient numbers of activist groups and citizens, political value was created. In other words, the collective nature of the action increased its constituent representivity and triggered the exploration of compatible goals.

Switchers are unlikely to be a single individual, but rather a group of actors. This not only negates the risks inherent in self-serving individual actors as switchers, but it also

makes a bringing together of interests and influence that will connect networks more likely: “more subtle, complex, and negotiated systems of power enforcement must be established,” and “the programmes of the dominant networks of society need to set compatible goals between these networks” (Castells 2009, 47).

In the case of the predicting dengue fever project, value was created in the scientific network (by an academic at a university in Paraguay). The new knowledge that it created using open data as a predictive tool is of value to the scientific network that seeks to establish verifiable truths about the world. But it is the government agency that must use the model created and its predictive capabilities to better manage the scourge of dengue fever for the benefit of marginalized rural and Indigenous publics. However, the value of new knowledge is not necessarily a value shared by the government agency; this is because it operates in a network with a different political programmatic logic that seeks to protect its position of political power. It is not that knowledge has no value in political networks, but rather that it is only when that knowledge serves the purpose of protecting the network that it takes on value.

New knowledge that allows a government to predict outbreaks in rural Paraguay may hold little value for government. Moreover, government operates at the national level, whereas the developers of the predictive model, when they are seeking validation for their truth claims, are operating at a different level in the global scientific network. The global health community also operates at the global level, according to a network logic more closely aligned with that of the global science network—and both are more communal. This allowed the project to switch effectively between the scientific and global health networks, but it has been less successful at switching between the scientific and political networks (for the time being, at least).

In the A Tu Servicio project, a notable shift took place when the civic tech company and the government department in the Ministry of Health were negotiating their cooperation agreement on creating an app that would use open government data to provide information on health service providers in Uruguay. The civic tech company’s main purpose for repackaging open data on health service providers was to give the public a wider choice and to allow citizens to move from one service provider to another based on the information provided by A Tu Servicio. However, the government was not in favor of an annual mass migration of citizens between service providers; it was far more interested in the value of the information to make service providers more transparent and accountable to Uruguayans. The government also argued that promoting choice over accountability could destabilize the system, whereas the civic tech organization’s starting position was in fact to disrupt the current system. In other words, the two parties saw different values in the data. Notably, the civic tech organization changed its

position to align with that of the government department, thereby harmonizing the value proposition of the information and the intended outcomes of its use. The net result is a more transparent system in which health service providers are more accountable to government and citizens, there is more informed decision-making on the part of citizens, and there is a manageable number of transfers of less than 5 percent per annum to new health service providers.

Open government data is a “networked movement of technologists, activists, the private sector, and civil society actors” (Davies and Bawa 2012). Power in networks is corralled by the first-movers (knowledge workers and the technology savvy) and consolidated by those with historically endowed power. This networked nature of the global open data movement is highly relevant in relation to social inclusion. When switchers connect social actors in local networks to global networks, they must abide by and accede to the rules, protocols, and standards of global networks; these rules, protocols, and standards are determined by those who program global networks. The programmers of global networks provide the basis for inclusion. In other words, if a move from the local to the global does not conform to the network power in a global network, the switch will fail. The network power of global movements, including the open data movement, will, as a structural feature of networks, exclude by determining the rules of inclusion.

Network Inclusion versus Social Inclusion *Inclusion* was initially defined in network terms as meaningful participation in information networks by those habitually excluded. But the term could also be defined as the improvement of the position of those already in existing information networks in relation to central nodes where decision-making is concentrated. An improvement in a networked position, or being closer to more central nodes in networks, means having more information to contest the decision-making in central nodes that follow the logic of the network. This broader understanding of inclusion resonates with Castells’s definition of one of the four forms of power in networks: *networked power* is “the power of social actors over other social actors in the network” (Castells 2007, 28). In other words, not all social actors share power equally in networks, leaving some social actors excluded from centralized power nodes. Bringing those actors within the same network closer to central nodes is also a form of inclusion.

In the case of Esoko, smallholder farmers were already participating in the agricultural network, but their relative position in the network was improved by information on the market prices—farmers were able to negotiate better prices with wholesalers. In the case of A Tu Servicio, almost all Uruguayan citizens have access to healthcare,

and, as such, the provision of comparative information on healthcare service providers could not have resulted in more inclusive healthcare. But the availability of the information did empower some in the healthcare network to make more informed decisions about which healthcare service provider to select. In the case of the availability of comparable medicine price information in South Africa, the likelihood of the information leading to greater inclusion was stunted by the fact that patients in the public healthcare system pay a flat price for medicines dispensed by state-owned pharmacies. However, not all private healthcare patients are of equal means, and the information has empowered some private patients to make beneficial decisions in terms of the cost of their medicines. Moreover, the use of information by intermediaries, such as doctors in private practice, provided poorer private patients with access to cheaper medicines.

This type of inclusion may not sit well with those who are completely excluded from information networks, as they may see network inclusion as the social progression of those already privileged toward the network elites. For them, it is networking power and network-making that must be disrupted in order for true social inclusion to take place. However, it is possible that some social actors, particularly intermediaries, that are included in information networks may represent the interests of those who are excluded. By improving their position in networks, and in so doing improving their ability to challenge the programmatic logic of the network, these actors could disrupt power in the network, thereby creating new network nodes that allow the excluded to participate in a reprogrammed network. Such a route to inclusion, however, does depend on the propensity of those already in the network to act on behalf of those excluded from the network.

Most projects included for analysis show a redistribution of networked power but little disruption to networking power. In other words, improvements in the position of some social actors already within networks can be attributed to open data, but *open data did not redistribute networking power*. And in one case, as illustrated in the following section, open data strengthened existing nodes where power is concentrated, resulting in an increase in the exclusion of a marginal community from a financial network.

Exclusion While it has been shown thus far in this chapter that intermediaries play important roles in terms of adding value to open data and creating connections within and between networks, intermediaries should not be seen as a panacea in ensuring open data's positive impact on social inclusion. Intermediaries have their own vested interests and are not ideologically neutral (Schrock and Shaffer 2017). Furthermore, it cannot be assumed that the usual suspects (i.e., the most visible or vocal of the CSOs) represent those constituencies (including the marginalized) that they claim to

represent (Enaholo 2017; Neubert 2011). While we had limited data at our disposal to explore the dark side of intermediaries, the possible negative effects that may accrue if, for example, Esoko were to marketize the personal data that it collects from farmers should not be glossed over; they require further investigation. In the case of the Bhoomi Program, the activities of legal professionals as intermediaries in conferring commercial value to land data have been shown to result in the exclusion of the very farmers who were meant to benefit from the public availability of the data (Benjamin et al. 2007).

Counterpower Counterpower in the network society is exerted when social actors attempt to change the programs of specific networks, disrupt the switches that represent the dominant programmatic logic of the network, or both. We have shown that a disruption in data flows across networks may occur when data previously shared exclusively within one network or between selected nodes in a network are made openly accessible. We also showed that it may require the repackaging of data into usable information in order to challenge existing configurations of network power.

However, the analysis of the fourteen open data projects in table 10.3 shows that there were no instances where the dominant programs of existing global networks or the switches that connect across these networks were reprogrammed or disrupted—either by making data open or by making them both open and usable. In fact, in one case, the public availability of data had the opposite effect: it allowed an existing global network to consolidate its position at the expense of local communities. In other words, a disruption in the flow of data or its conversion into usable information does not necessarily equate to a disruption in the distribution of power.

At the same time, evidence was found of open data's propensity to create convening spaces (see the previous analysis of the fifteen OD4D projects in table 10.2), and it is conceivable that such spaces could open opportunities for counterpower to be exercised if programmers and switches are brought together. Similarly, opportune niches may create nonphysical networked spaces or moments in which existing power arrangements and distribution may be countered.

Conclusion

Castells's elaboration of the network society is not a theory per se (Stalder 1998); rather, it presents a way of thinking about and understanding society. Our approach has been the same. We have neither used nor offered a rigorous theory on the relationship between open data and social exclusion. Ours is a modest attempt to provide a grounded and empirically informed approach to understanding the relationship—one that will hopefully ignite robust debate and challenges to our framework and findings.

We acknowledge that what we have proposed as being influential factors in the relationship between open data and social inclusion is limited by our reliance on existing primary and secondary sources that describe and report on open data initiatives that were not expressly designed with social inclusion in mind. We take some refuge in the fact that, while they may not always be explicitly framed with social inclusion in mind, projects were nevertheless designed within an overarching framework that assumes social inclusion is a desired outcome of open data initiatives. We further acknowledge that our research would have benefited from in-depth interviews not only with those who designed and implemented the open data initiatives included in our analysis, but also with the intended beneficiaries of those initiatives. It was simply beyond the scope of this research to do so for the close to thirty open data initiatives implemented across the globe.

These limitations notwithstanding, we believe that we have offered an important first attempt to answer the ambitious question posed by this chapter: How, for whom, and in what contexts do open data contribute to inclusive development?

With the data at our disposal we were unable to show with any degree of confidence that the OD4D open data initiatives have resulted in greater inclusion, especially if inclusion is deemed to be meaningful only if it empowers those who are habitually excluded. On the other hand, one feature that was consistent across the open data projects analyzed is the catalytic and convening properties of open data. In a range of contexts, open data were found to bring together diverse stakeholders who shared a common interest in resolving a mutual problem using a free public resource.

The question arises as to whether there is something inherently special about open data—its perceived neutrality or the fact that access is nondiscriminatory—that complements the known preconditions required for collaboration to occur (Wood and Gray 1991). And further questions would need to be asked as to whether the potency of open data's convening power is dependent on the political sensitivity of the problem, particularly if, as Castells and Himanen (2014) suggest, government needs to participate as the central stakeholder in formulating and contributing to solutions that drive inclusive development. More politically sensitive problems may well exclude government but galvanize nonstate actors more effectively, leaving them at loggerheads in their perceptions on the use-value of open data as an instrument for inclusive human development. Recent shifts away from globalization and toward nationalism may not bode well as governments recede from public participation and attentive citizens become more demanding.

The analysis of the outcomes of fourteen open data projects in this chapter uncovered evidence of access and participation as components of inclusion. This could indicate

that while there is insufficient evidence to support claims of open data's impact on social inclusion, there is nevertheless evidence of a more open and potentially participatory approach to governance practice.

It may be tempting to infer that the materialization of open data's causal relationship with more inclusive governance is simply a matter of time. That is, as open practices diffuse through and across public institutions, inclusiveness will tend to follow. However, a more holistic reading of the state of open data at a national level, and one that includes open data readiness and implementation indicators of open data practice, shows that governments are in fact regressing. In other words, open data practice as a contributor to more equitable governance is losing the foothold that it has established over the past three years (Brandusescu et al. 2017).

From our findings, we would offer that this regression occurs because open data practices centered around access and participation have not successfully disrupted the concentration of power in political and other networks. And where disruption of some kind is taking place, when opportune niches open up to attract new social actors (including intermediaries) into networks, and when these new actors add value to the open data, there remains a critical breakdown in the transfer of value between networks. Without transfer between networks (particularly, but not exclusively, to global political networks), the propensity for the uptake and use of information derived from open data by central nodes of power where decision-making is concentrated remains limited.⁸ Where such value transfer takes place, the cases reveal instances of network inclusion.

In other words, open data improve the position of social actors already included in networks in relation to central nodes of power in those networks. Peripheral elites can either use open data to accumulate power and gravitate further toward the central elites or they can use open data to challenge the central elites and seek to redistribute power across new nodes by challenging the dominant program of the network. Such challenges may result in a more equitable distribution of resources, or else it may simply create revised network programs that fail to transform the rules of distribution.

While network inclusion makes this indirect form of social inclusion possible (though as risky as it is promising), our findings indicate that, at least in our sample, open data are thus far making at most a limited contribution to inclusion. While open data may well be delivering other benefits in terms of the accountability of public institutions and increased efficiency, those habitually excluded remain outside networks where those benefits accumulate, and open data are doing little to change the status quo in terms of resource distribution.

To return to Castells and Himanen's (2014) proposed conception of development in network societies, we found no evidence of open data leading to a more synergistic relationship between informational and human development, where the former is propelled by networked power according to a logic of informationalism and the latter is propelled by networking power according to a logic of welfarism. This leads us to suggest that open data are not contributing materially to the realization of the corrective and redistributive policies needed for a synergistic relationship to manifest. Nevertheless, it is hoped that this first foray into the relationship between open data and social inclusion—one that has attempted to uncover the dynamics of power accumulation, distribution, and disruption in network societies—will provide useful insights for the open data movement, as it mobilizes future resources and will open a promising line of inquiry for open data researchers who are eager to distill the true value and impact of open data for development.

Notes

1. See, for example, GovLab (n.d.), Open Knowledge International (n.d.), and Open Data Charter (2015).
2. Stalder (2005, 62) states, "At the interconnections of such flows, nodes arise. Nodes are structures built by the recurrent intersection of different flows which they, at the same time, process and direct. Nodes can have the form of large institutions, such as banks or government agencies that depend on the constant input of information which they process and feed back into the flow as new information."
3. For more information, see OD4D (<http://www.od4d.net>). For a detailed account of the evolution of the broader OD4D initiative's theory of change, see Davies and Perini (2016). For an evaluation of the OD4D initiative, see Acevedo-Ruiz and Pena-Lopez (2017).
4. An examination of the theories of change of the open data programs undertaken by the OD4D partners was done to assess how they describe the process by which open data leads to more inclusive development outcomes. While one may posit that theories of change are merely static, abstract ideations on how development projects are meant to take shape, theories of change nevertheless articulate the underlying rationale of why development interventions are executed, and, of relevance to this research undertaking, how they *presume* to improve the lives of certain communities. Theories of change of a total of nine OD4D partner programs were analyzed to determine whether and how they articulated a pathway from open data to inclusion. OD4D projects were selected from these programs.
5. The project A Tu Servicio was included in both the change theory and the outcomes analyses. It was the only project from the fifteen theories-of-change projects for which there was sufficient documented evidence for the outcomes analysis.

6. For more about data scraping, see https://en.wikipedia.org/wiki/Data_scraping.
7. See Andrason and van Schalkwyk (2016) for three examples of intermediaries taking advantage of opportune niches in the agriculture ecosystem in Ghana.
8. See Peixoto and Fox (2016), who reach a similar conclusion that the most successful cases are where civil society and government cooperate.

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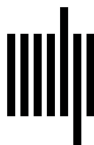
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