

# Social Enablers and Constraints Related to the Publication and Use of Open Government Data in a Developing Country

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**Abstract.** The promise of Open Government Data (OGD) rests on the publication, availability, use and reuse of government data. This research focused on how social factors such as data ownership, network creation and power enabled or constrained the publication and use of OGD in Ghana, a developing country in West Africa. Ghana's government data was expected to be both legally and technically open. However, socially constructed behavioral patterns and practices such as power, data ownership and network creation played critical roles in influencing the institutionalization of OGD in Ghana. An interpretive descriptive case study analysis helps understand how social processes influenced the institutionalization of OGD publication and use in Ghana. Giddens' Structuration Theory was used as the main theoretical lens in this study because of its ability to investigate the dynamic interplay between social agency and social structures. Findings from the study indicated that power within Ghana's OGD ecosystem is associated with legitimized practices and behaviors such as data ownership, culture and networks.

**Keywords:** Open Government Data (OGD), Open Data, Structuration Theory (ST), Power, Data Ownership, Network Creation, Ghana.

## 1 Introduction

The process of adoption and advancement of e-government led to the birthing of the Open Government Data (OGD) movement that has been embraced by both developed and developing countries [1]. OGD is government or public data that is available, usable, reusable and accessible at the least cost possible; such data should be both technically (in machine-readable formats) and legally available [2]. The concept and practice of OGD were introduced as a means of avoiding secrecy in government by making government data technically and legally available to citizens [3].

OGD can be regarded as "machine-readable data which is discoverable, available, and downloadable through dedicated internet portals without cost to potential data users" [4]. The OGD ecosystem's main stakeholders are Data Publishers (DP) and Data

Users (DU), who have differing roles and views of data [5]. These stakeholders are required to collaborate despite their differences in roles and views of OGD to enable effective implementation [6]. The expected outcome of implementing OGD is to create and generate public value [7]. Governments who want to formally engage in the OGD movement, join by signing as partners of the Open Government Partnership Initiative (OGPI) and by completing biennial Action Plans.

Ghana joined the OGPI in 2011 and has developed and completed multiple Action Plans since 2011, however the publication and use of OGD remained limited. This has been attributed to inadequate intermediaries (or Data Users) and challenges of data quality [8]. Data quality is concerned with validity, confidentiality, privacy concerns, liability, completeness, metadata, technical and semantic interoperability [9]. Data quality in developing economies is a challenge [10] that influences both the publication and use of government data.

Although OGD research has received a lot of attention in Information Systems (IS) research [1, 2], there is still a paucity of contextualized research on how socially constructed behavioral patterns and practices influence the institutionalization of OGD publication and use in sub-Saharan Africa. Such factors have been recognized as important determinants of the successful institutionalization of IS [11]. While data ownership is regarded as important in IS research [12], this is lacking in OGD research.

While the factors that influenced OGD in Ghana may have included data quality, there existed underlying socially created and recreated patterns and practices that were influencing the publication and use of OGD and its institutionalization. For this reason, a case study was performed that drew on theories such as Giddens' structuration theory in order to meet this study's research objective, namely *to understand how social processes have influenced the institutionalization of OGD publication and use in Ghana*.

The paper is structured as follows. First, key concepts are introduced and the case setting explained. Subsequently, the research method and theoretical underpinnings are provided. This is followed by an analysis and discussion of the findings. Finally, the conclusion of the study reflects on the findings and provides recommendations and suggestions for future research.

## 2 Background: Key Concepts

*Open Government Data (OGD)* is linked to open data as well as open government. An amalgamation of these two terms gives rise to the concept of OGD [13]. Open data refers to the free, unrestricted access, use and reuse of data [14] while the open government is an initiative by governments to make their data available on data web portals to promote transparency, accountability and to increase collaboration with stakeholders [15]. However, OGD should not only be associated with the availability of data on government web portals but also with the provision of data that has reusable capabilities [16].

*Actors in the OGD ecosystem* include public administrators, bloggers, NGOs, academic researchers, data journalists, international organizations, donors and beneficiar-

ies [5]. Actors in this study are individuals who fit into the description of Data Publishers and Data Users. The OGD ecosystem actors' understanding of OGD is shaped by contextual factors such as interest and power [5].

*Institutionalization* refers to the process of routinizing cultural practices, rules and norms [17]. Institutionalization attempts to explain how institutional rules, cultural practices and norms become accepted or rejected in a social system or structure [18]. Institutionalizing OGD practices and policies in public institutions has become a challenge due to the inability of government to merge openness into known rules, norms and cultural practices [19].

The significance of understanding the role of *power in IS* cannot be underestimated. Power is often used by actors (Data Publishers, Users and Public Sector Intuitions) as a way of influencing each other [20]. The process of information dissemination and control among actors in organizations unearths issues of how power is distributed within the organization [21]; how actors acquire this power determines how they disperse it. The innovation and routinization of IS by actors in an organization, unravels different notions of power; hence the need to combine different theories for suitable interpretation and conceptualization [20].

*Ownership* has been difficult to define due to its complexity [22]. Understanding the concept of ownership is regarded to be as important as the acquisition of technical skills, education, finance and infrastructure in the era of openness [23]. An organization's perception of data ownership influences critical decision-making such as IS outsourcing, centralization or decentralization [22].

*Networks* are created through the social interaction between actors in an organization as well as between organizations [24]. Actors play different roles and occupy different authoritative positions in the networks [24]. Such roles and positions create an atmosphere of perceived trust between members of the network. Networks vary in size and are dependent on the actors in the social connection and their interaction. Organizational success is dependent on social networks [25]. In the context of knowledge management, networks are created to transfer tacit knowledge and develop new knowledge, which organizations depend on for future endeavors and transfer of skills [26]. In the knowledge network, organizations support a repository of both explicit and tacit knowledge which is distributed among actors [27]. Research in OGD has thus far paid limited attention to network aspects. This study considers the role of network creation in the successful use of OGD by Data Users. Networks can enable Data Users access to funding support, international exposure, determine data quality and access to data.

The primary *theoretical lens* used in this study to highlight the social processes influencing the institutionalization of OGD is Structuration Theory (ST) [28]. The relevance of ST to the study lies in its ability to surface underlying social factors that influence people's behavior and practices over time [29]. Castells' [30] and Honoré's [31] theoretical explanations to power in networks and data ownership were used to provide additional theoretical explanations to the empirical findings. The combination of theories is recognized as an acceptable practice in IS research [32].

### 3 Case Study Context

Ghana is a country in West Africa with an estimated population of 28 million people. The country is associated with democracy since 1992. Ghana has an elected president, a parliament, an independent judiciary, electoral commission and different public sector institutions. The public sector institutions are in charge of implementing government initiatives and fostering the relationship between government and citizens.

Ghana became a signatory to the ‘Open Government Partnership Initiative’ (OGPI) in September 2011. This was a way of strengthening prevailing open government frameworks incorporated in the practice of democracy [33]. The OGPI seeks to attain these goals through government commitments. The completion of the first Action Plan set the motion for the development and implementation of subsequent Action Plans. Lessons learnt, gaps identified, and fissures recognized from the previous Action Plans informed the activities of subsequent ones. Recent developments of the OGD initiative in Ghana can be traced to several activities such as workshops that focused on creating data awareness and increase in stakeholder engagement with data. The workshops also aimed at training participants on how to use available government data to create mobile and web applications through hackathons and advocacy activities. For example, a hackathon challenge was held in April 2019, this led to creating a “waste to gold” platform with an aim of tackling waste management in Ghana [34]. The workshops also discussed how to promote collaboration between different institutions, identification of data needs, promoting data use and improving data quality [35].

The Ghana OGD ecosystem has two government approved publishers. The two publishers are the Ghana Statistical Service (GSS) and the National Information Technology Agency (NITA). The **Ghana Statistical Service (GSS)** is regarded as the ‘Government Statistician’. After Ghana’s signatory to the OGPI, the responsibility of GSS has extended beyond just a collection and disseminating of statistical data. GSS is mandated to ensure that government data is open, accessible and in user-friendly formats. GSS is now also charged with the responsibility of developing, collecting, disseminating and reporting government data and further assessing it based on the indicators of the Sustainable Development Goals (SDGs). The **National Information Technology Agency (NITA)** was established in 2008 under the Ministry of Communication. The agency was mandated to act as a backbone for e-government in Ghana and the implementation of government ICT policies. After Ghana became a signatory to the OGPI, the responsibilities of NITA were extended to include developing the open data web portal in 2011. NITA was expected to coordinate and publish data from the various government institutions (Ministries Departments and Agencies). This was required to remove data redundancy and create a unified platform that makes government data available and accessible and at the least cost possible.

**DUs (intermediaries)** include Non-Governmental Organizations (NGOs), data enthusiasts, data analysts and data journalists, who create mobile-based technology solutions and educate citizens with the help of data. Their demand for and use of government data is critical because they can create and trigger major impacts. Some key NGO’s are Mobile Web Ghana, Esoko, Famerline, as well as data enthusiasts, data

scientists and data journalists. These NGOs have been actively involved and collaborated with government and international organizations due to the OGD movement. For example, Mobile Web Ghana has been actively involved with organizing the Ghana Open Data portal upload challenge and hackathon in 2019 and mapping for the Open Cities Accra Project [34]. The Open Cities Accra Project uses OpenStreetMap, field data collection and remote mapping to make flood-prone areas in Accra more resilient to flooding. Mobile Web Ghana has been involved in a workshop on domestic violence, child labor and Data Management and Publication Training for Government Agencies and Ministries. Likewise, Esoko partnered with government to collect and publish data on about 10,000 farmers in 10 districts. This data was linked with a social interventionist program called Livelihood Empowerment Against Poverty (LEAP) [36].

#### 4 Research Methodology

The research strategy for this study entailed a single descriptive case study [37], namely the case of OGD in Ghana. The study was executed in an interpretive fashion.

Data were initially collected from the two main OGD publishers in Ghana and several OGD users (academia, data journalists, Non-Governmental Organizations (both profit and non-profit; citizens; international researchers and observer groups and organizations; technology enthusiast). The initial data sample was changed due to emerging themes, for instance, the researcher added other government institutions who were not regarded as OGD publishers. The sample population of OGD users were mostly based in the Greater Accra, Ashanti and Central regions. These three regions are urban cities and well populated. The Greater Accra region, for instance, is the capital city and also the seat of government, the region houses all the government institutions.

Semi-structured interviews were conducted with the assistance of an interview guide. **Table 1** provides a summary of the interview participants and data sources.

**Table 1. Data Sampling**

Category	OGD Stakeholders	# Interviewees	Source of Data
Data Publishers (DP)	Data Publisher 1	8	Group interviews, observation, website, documents
	Data Publisher 2	2	Group interviews, observation, website, documents
Public Sector Representatives (PS)	Public Sector 1	1	Individual interviews
	Public Sector 2	1	
	Public Sector 3	1	
Data Users (DU)	Data User 1	2	Group interviews, websites and participant observation
	Data User 2	2	
	Data User 3	2	Group interviews, websites and observation
	Data User 4	2	
	Data User 5	3	
	Data User 6	3	
	Data User 7	3	
	Data User 8	3	Group interviews, observation, website, documents

Giddens' structuration theory was used as the main theoretical underpinning for this study. However, during the analysis of the empirical findings additional explanations were required. The findings indicated that data ownership, power and network creation were socially constructed and thus had been created and recreated over time. Data ownership, power and network creation were already existing structures that kept routinized activities the same, which is line with the Giddens' structuration theory [28]. However, Ghana's signatory to the OGD movement triggered changes which were not in-tune with these routinized existing structures. Thus, these existing structures instead of aiding the OGD movement rather led to the un-institutionalization of OGD. This affected both the publication and use of OGD in Ghana. Thus, in the discussion of the findings, the study blended structuration theory [28] with Castells' categorization of networks [30] and Honoré's categorization of data ownership [31].

Giddens' structuration theory is concerned with the reciprocity between human agency and social structure [28]. Structuration theory highlights the duality of interaction between social practices and human actors. The interaction between human actors and social behavioral patterns are produced and reproduced over time [29]. Social structure, in terms of rules and resources, can either facilitate or constrain social activity [29]. There is, therefore, a recursive relationship between structure and actions [28]. Structuration theory is used by researchers to understand social occurrences and the reproduction of behavior and practices across space and time [29]. The repetitive nature of these behavior and practices overtime become institutionalized as part of the social system. Structuration theory can be summarized by the dimensions of the duality of structure namely structures of signification, domination and legitimation, linking respectively to interactions of communication, power and sanction [28]. **Table 2** lists the theoretical constructs of structuration theory that are applied in this study.

**Table 2.** Concepts of Structuration Theory applied in this study

Construct	Propositions	Particularization
Agency	Also referred to as human, social actors, individuals or people. Giddens' assumed and recognized the knowledgeability of actors within the social system. Agency also determines acceptable and unacceptable behavior within a structure plus its accompanying rewards or sanction. Actions are replicated recursively.	The ecosystem has multiple actors with different roles and varying meanings attached to OGD activities [5].
Structure	The structure consists of rules and resources. The existence of structures is dependent on the intertwined relationship between structures and agency. Structures enable the <i>recursive</i> production and reproduction of social systems [28].	Different rules and resources are used by actors with the aim of either publishing or using OGD. There national, international and organizational rules that have been produced and reproduced over time
Domination	The <i>structure of domination</i> is evident in every <i>social system</i> and noticed via the unevenness of allocative and <i>authoritative resources</i> [28].	Social actors (DUs, PSs, DPs) perceived data as a resource which needed to be controlled. Observations during the group interviews showed the existence of actors' ability to control others based on positions of authority and symbolic capital.
Communication	Individuals within a structure communicate based on commonly acceptable schemes. Individuals are conscious schemes as they part of	Actors created networks purposely to get access to government data, exposure, funding and determine the quality of datasets.

	the structure of signification (rules based on which meanings are produced).	
Legitimation	Norms are part of the legitimation structure which allows sanctions to be evolved if not adhered to. Actors within the social system are aware of such norms as well as the sanctions.	Organizational actors were aware of the norms that guide data publication and use as well as the sanctions. But sanctions in this context was symbolic.

Castells [30] categorizes four types of networks namely:

1. “Networking Power: the power of the actors and organizations included in the networks that constitute the core of the global network society over human collectives and individual who are not included in these global networks.
2. Network Power: the power resulting from the standards required to coordinate social interaction in the networks. The exercise of power is dependent on rules of inclusion and not by network exclusion.
3. Networked Power: the power of social actors over other social actors in the network. The forms and process of networked power are specific to each network.
4. Network Making Power: the power to program-specific networks according to the interest and values of the programmers, and the power to switch different networks following the strategic alliance between dominant actors of various networks”.

These types of power in networks exist in social systems where actors perceive they have power over other actors due to the personalization of the control of data. However, the type of network is determined and defined by the particular network actors are involved in within the social system.

Honoré’s [31] categorization of ownership includes: “The right to use whatever is owned; the right to control the use of whatever is owned; and the right to remain in control of what is owned, without interference from others”. Honoré’s [31] grouping identifies ownership from the perspective of property that requires identification and personalization by individuals. Honoré’s work is relevant to this study, since it was found that actors’ perception of data led to individual personalization of data which constrained data sharing and publication.

## 5 Findings

### 5.1 Thematic Analysis

A thematic analysis was performed [38]. “Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data” [38] p 79. The thematic analysis in a study already starts when transcribing the data and ends with the completion of the study. **Table 3** lists the themes and how often they were referenced.

**Table 3.** Coding References for Themes Generation

Themes & Number of Coding Referencing			
Node	# of references	Node	# of references
<b>ACTORS</b>	150	<b>NETWORK CREATION /DATA SHARING CULTURE</b>	98
experiences, history	90	national	55

roles	89	organizational	90
views	50	trust as a challenge	98
<b>CONTROL\POWER</b>	120	unintegrated and semi-integrated systems	68
social construction	98	unreactive nature of data sharing	98
Individual control	77	Publication of data by DPs	80
Institutional control	100	Submission of data by PSSs	50
Organizational Control	97	<b>RESOURCES DPS, PSS</b>	100
resources, time and money	100	data as a resource	117
Right to control use	110	human skills and knowledge needed	98
<b>DATA OWNERSHIP</b>	200	laws	50
citizens data	70	technological resources	100
government data	200	Resources DUs	120
organizational data	100	human skills and experiences	150
right to control the use	110	technological	99
right to control use	100	<b>USE</b>	70
		<b>Publication</b>	80

**Data Ownership.** Ghana's signatory to the OGPI has unearthed some contextual issues which were related to who owns the data. DPs and PSSs were conscious of the concerns surrounding data ownership. The issue was frequently mentioned in interviews. Data owners were contextually defined to be the actual government institutions in charge of collecting, processing and storing citizen's data. PSSs perceived that institutional resources were used to accumulate and store citizen's data. This gave institutions a sense of ownership over data. Also, the existence of unintegrated and manual processes in the public sector was explained as a contributing factor. Both DUs and DPs explained the importance of giving recognition to the sources of data during use and publication. To DUs this acts as a form of protection. OGD publishers and users identified public institutions and online portals as critical primary sources of data.

The contextual explanation of ownership resulted in complexity with the inception of the OGD movement. OGD required signatory governments to develop a web portal aimed at publishing government data. However, critical attention has not given to data ownership. Consequently, there was empirical evidence of various arguments about who owned data within the OGD ecosystem. These arguments on data ownership were unearthed due to the inadequate nature of the published data. While some of the interview respondents believed that government data belonged to "government" others believed it belonged to the citizens. However, in a report on the impact and status of Open Data in Africa, the authors explained that "data belonged to the citizens" [39]. While some interview participants explained that data on the government-mandated web portal was regarded as government data, others asserted that, though the data was available on government web portals, the data is about the people, hence it belongs to them. As emphasized by some of the interview respondents:

*"The misconception is, who does the data belong to? This is a critical discussion that we need to have but has not been seen as important. It is like it is difficult for the very people whose data has been accumulated to get access to it" (DU10; also representing the views of DU1, DU5, DU7, DU20).*

DUs recognized the value of understanding data ownership within the local OGD ecosystem. Data was understood as a powerful tool of which the owners or publishers should be recognized. Understanding data ownership enabled DUs to disassociate themselves from issues that arose after publishing stories. Identifying and recognizing

data owners was essential as it provides a type of credibility in situations where sensitive stories had to be told. Recognizing data owners within the OGD ecosystem by DUs enabled them to identify which DPs' data to use. The interview participants explained that data was obtained and accessed from different sources. These sources ranged from national to international websites. While some of the DUs had a pre-determined mindset on their sources of data, others could be categorized as "freelancers" who used government data from any source; to such DU the most important aspect is the availability of the data. An interview participant stated the following:

*"I sometimes get it from data.gov.gh, which is down at this moment. In the last two years, if I need government data, that is where I got to first. I also check the website of DPI and the websites of other government institutions. I check there to see if I can find the data I want."* (DU9).

Actors' perception of Data Ownership led to data control. Controlling data led to institutional personalization of data and the desire to control the data both within and outside the institutional boundaries. Institutional personalization followed from the use of resources such as organizational time, money and skills used in collecting, process and storing data; there was a desire to exert some kind of influence. In addition, the subtle autonomy and integrated system led to the development of the concept of institutional personalization. Some of the participants elucidated that time and money invested in data gathering, processing, storage and disseminating data influenced the attitudes towards control. Institutional personalization of data also resulted in an attempt to control data use by potential and actual users. Some OGD publishers explained that it was essential to control data both within the institution and outside the institutions for ethical reasons including data ownership. Institutional personalization of government data further resulted in the desire to continuously monitor or control data use. It influenced both OGD publication and use.

*"If I give you my data, I have the right to know what you are going to use it for and be acknowledged. I need to feel it is still mine. But the moment I give it out I lose that feeling [...]."* (PS1, also supported by PS3).

**Network Creation.** Networks were intentionally and unintentionally created by Data Users. Networks were social connections created between DUs, international donor organizations, national technology enthusiasts as well as government institutions. These networks were created for different purposes. The purposes included financial and technical resources as well as data access. These networks provided a type of social connectedness, which were established as a means to express domination with regards to access to data (that should otherwise be open) and as a source of competitive advantage. Competitive advantage existed among DUs within the OGD ecosystem. This social connectedness was established either based on friendship, social engineering or professional standards. Creating social connections within the OGD ecosystem was deemed as a requirement because it provided the DU both social and technological exposure. Most of the DUs used available data either to tell stories or create technological mobile applications that were intended to trigger social conversation and create an impact.

However, most of the DUs were in existence before the introduction of the OGD movement in Ghana. The OGD movement and created networks led to an increase in the incorporation of government data into their routinized activities and structures.

*“We are supported by different organizations, it is needed for exposure. When you go to our website you will see them [...] they are mostly international. You must be connected since your connections give you an advantage over other organizations in this thing that we are doing. Knowing the right people in this space is necessary, not just nationally but outside Ghana” (DU 18, also supported by DU 20).*

Created networks were used as a means of interaction between data publishers and users. This interaction was required to either enable quick access to data or provide additional understanding of the available data. The networks created by DUs were: 1) National Networks, this was sub-categorized into network created between DUs, PSs and DPs and Networks created among DUs; 2) International Networks.

**Power in Networks.** The networks created by DUs transcended beyond the local environment to include international networks or connections. The networks, both local and international, were established to ensure that government data was technologically and legally opened and to reuse data to create value for citizens. Reasons for creating international networks also included funding and exposure. These networks led to the creation and creation of power-related structures that were founded on access and use of government data plus other resources. The type of power emanated from the ability of the DU to control or influence the activities of DP and government at large. The power within the networks was used to trigger responses from both local and international OGD communities. The changes and responses that have occurred within the OGD ecosystem would not have been possible without the actions of the socially created power in networks. For example, by using and analyzing different government data from parliament, Odekro (a Ghanaian civic organization promoting government transparency) was able to establish trends that critiqued parliament attendance by parliamentarians from 2013 to 2016. The report also exposed the performance of parliamentarians, this was debated as a key determinate of elections. The report of Odekro was one example of power within networks that critiqued government representatives and made citizens aware through the use of government data.

*“[...] providing citizens, communities, media and civil society with the necessary data with which to hold parliament and MPs accountable [...]. This report was critical because the lack of quorum brings to a halt government business and may delay or even rush the consideration or passage of crucial bills[...]" [40].*

## 6 Application of Theory to Findings

In this section, the theories introduced in section 4.2 are applied deductively to the empirical findings.

**Agency and Structure.** The OGD ecosystem consists of multiple actors with multiple roles and responsibilities who engage in social practices through social interactions. The interactions within social practices are shaped by commonly understood interpretive schemes, sanctions and communication [29]. The actors could be broadly categorized into Data Publishers, Public Sector Institutions and Data Users. OGD actors also include public administrators, bloggers, NGOs, academic researchers, data journalists and their beneficiaries [5]. Within each of these broad categories existed social actors with varying roles and responsibilities [29]. These actors existed and interacted in various ways within the OGD ecosystem. Such interactions lead to the creation and re-creation of both meaning and unintended effects of Data Ownership, Power and Network Creation. The interaction between actors was shaped by rules and resources [28]. For example, actors' perceptions of data ownership can be derived from the identification of data as a resource which is guided by different socially constructed legitimation criteria in a network. Data Users interact in a given network to determine data quality before use via a set of acceptable rules and available resources.

**Structures of Signification.** Actors within the OGD ecosystems have produced and reproduced subjective meanings associated with Data Ownership, Power and Network Creation over time. For example, Public Sector Institutions have both organizational and individually personalized and subjective view of organizational data which resulted in the desire to control it. Such created meanings influenced the actors' interaction within the social structure or OGD ecosystem and thereby continuously affecting the lack of institutionalization of OGD publication and use in Ghana. Interaction between actors in a social system has a recursive effect on how social systems are shaped over time [28]. While DPs and Public Sectors recognized their respective institutions as owners of data, Data Users also recognized government and citizens as owners of data. The concept of data ownership is linked with the perceptions and behavioral patterns of actors inside rather than outside organizations [41].

The perception of Data Ownership has contributed to the un-institutionalization of OGD publication in Ghana. This can be attributed to fear of losing control and relevance as 'Data Owners'. Using ST to understand the concept of ownership reveals the difference between equity and dialectic control existing between actors in a network as well as the influence of power in such institution [42]. From the perspective of ST social behaviors were to result in sanctions; but the inadequate publication of OGD in Ghana by DUs and PSs which can be linked with specific social behaviors was yet to attract such sanctions.

By blending Giddens' ST with Honoré's [31] work, data ownership can be further explained. From the findings, DPs and PSs expressed their right over data in their possession due to the resources used in the accumulation of data. It was assumed that data belonged to such institutions which gave them institutional and individual right of the data. This influenced data control, use and quest to continuously remain in control of data in their possession. Honoré [31] explained that the perception of ownership gives actors three rights: usage rights, controlling usage rights and continuously remaining in control. From the findings, actors held the perception that data belonged to their respective organizations; in some cases individuals in authority, thus they had the right to use,

control and continuously be in control of data use. Consequently, such actors reserved the right to determine when data can be released.

**Structures of Legitimation and Domination.** The creation of networks by DUs became a type of legitimation criterion for data access, determination of data quality, funding and international exposure. Although network creation became a norm among DUs, there were no clear sanctions attached. ST explains the link between norms and the structure of legitimation plus its attributed sanctions [29]. Organizational actors' perspectives on data ownership and networks created two forms of power: collective and individual power. Collective power extended beyond the quest to control data; it also included access and use of organizational resources needed in the process of accumulating and storing data from a collective standpoint. Data or information distribution often brings out issues of control and power [20]. Organizational actors used their institutionalized power to affirm their positions and control over data, this led to the creation of bureaucratic data request structures that were legitimized overtime. Domination was exercised on external actors who needed data for social intervention programs or publication.

Findings from this study explained that actors had different perceptions of power, relating to actors' affiliate organizations, roles and historical factors surrounding data ownership. Knowledge about the existing complexities with the theme of data ownership needs contextual explanations in this era of openness due to large amounts of data being produced and the multiple sources of data [23].

Data ownership and network creation revealed the concept of power, and its implications were expressed by the actors involved. Actors perceived data as an authoritative resource, this led to the creation of bureaucratic structures to control its accumulation, publication and use. Giddens explains power as a social construction, expressed via the use of resources [28]. The creation of networks showed the existence of power relations between OGD actors and international donor partners. Actors, through network creation, exercised power based on the number of international partners they had, funding and ability to access data.

Power in created networks can be explained from the perspective of Castells [30]. Networks were not formed in a vacuum, as such there existed evidence of power within these created networks. Although Castells categorized the power in networks into four types, the findings from this study supported three: 1) From the findings, it was evident that DUs created and valued networks created on the global level. It was perceived as a form of international exposure and power, the number of such networks created including the type of international organization meant was used as a form of power over DUs. Castells categorized this type of network power as 'Networking Power'. 2) DUs also considered their ability to have access data which was not published through social interaction as an exercise of power. To Castells, such power was 'Network Power'. 3) DUs, DPs and PSs exercised the third categorization of Castells' grouping. To Castells 'Networked Power' exists when actors perceive to have power over other actors within a social system which is defined by a particular network.

## 7 Conclusion

This research set out to understand and explain the factors influencing OGD publication and use in Ghana. Despite Ghana's signatory to the OGPI in 2011, OGD publication and use is yet to be institutionalized by DPs, PSs and DUs. An interpretive case study was performed, drawing from document analysis and stakeholder interviews.

The research demonstrated the need for both OGD practitioners and researchers to have adequate knowledge of the contextual backgrounds and ecosystems of countries prior, and during the implementation of OGD. An understanding of the different contextual backgrounds revealed different behavioral patterns and practices that were created and recreated by actors within the various structures. Although these behavioral patterns and practices have existed for many years, the possibility of transitioning must be considered as important.

The empirical findings revealed that Data Ownership, Network Creation and Power were socially created and re-created over time by DPs, PSs and DUs. These social patterns and practices existed prior to the implementation of OGD and were recognized as critical factors that influenced the institutionalization of OGD publication and use in Ghana. Actors within the OGD ecosystem had personalized the interpretation and meanings associated with Data Ownership. Ownership of data was seen in three ways by actors: government, organizational and citizen's ownership. The perception of Data Ownership led actors to view data as an organizational and individual property whose access and use needed to be controlled continuously by the 'owners'. The issues surrounding Data Ownership were attributed to the inadequate transitioning from manual, un- or semi-integrated systems to fully automated systems.

The implication of Data Ownership on OGD publication led to the creation and recreation of networks by DUs. These networks were used by DUs as a means to obtain data that should have been published as per the OGD signatory. The Networks had both national and international partners; national DUs relied on social connections to enable them to have access to data and determine data quality. International networks were used as a form of exposure and to secure funding. Within these networks existed a socially constructed perception and mutually communicated understanding of power relations that influenced OGD acquisition and use. Castell's explanation of Power in Networks provides an understanding of this part of the findings: 1) DUs created international networks (partners) for exposure and a way of expressing power over other DUs. Such networks were displayed on websites as a sign of prestige: this is referred to as 'Networking Power'. 2) Some DUs, thanks to their networks, had access to data that others did not possess; such data was used to trigger national debates and changes: 'Networked power'. 3) DUs also created networks that gave them the power to partner with government and organizes training workshops for civil right advocacy groups. Such networks were based on interactions and principles of social inclusion.

In summary, this study uncovered that social patterns and practices around Data Ownership, Network Creation and Power have a major influence on the institutionalization of OGD. This study, therefore, recommends the inclusion of change management principles that take explicit cognizance of these practices to achieve OGD implementation (publication and use) in developing countries due to the disruptive nature of the

phenomenon. Future research can focus on the application of change management principles in OGD implementation and quantitative analysis of these themes. Future research could also focus on reasons behind the use of symbolic sanctions.

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