



FACULTY OF COMMERCE

Department of Information Systems

University of Cape Town

Open Government Data Publication and Use in a Developing Country: A Case of Ghana.

By

HUBEIDATU NUHU
(NHXHUB001)

**Thesis Submitted in fulfilment of the requirement for the degree of Doctor of Philosophy in
Information Systems**

February 2022

The copyright of this thesis vests in the author. No quotation from it or information derived from it is to be published without full acknowledgement of the source. The thesis is to be used for private study or non-commercial research purposes only.

Published by the University of Cape Town (UCT) in terms of the non-exclusive license granted to UCT by the author.



Declaration

I, Hubeidatu Nuhu, hereby declare that this thesis titled “Open Government Data Publication and Use in a Developing Country: A Case of Ghana” results from my own research and has not been presented by anyone for any academic award in this or any university. All references used in the work have been fully acknowledged.

I bear sole responsibility for any shortcomings.

Signed by candidate

.....

Hubeidatu Nuhu

9th February 2022

DATE



Dedication

To my mother (Madam Salamatu Saani). I am grateful to you for ensuring that education was the first and foremost in every decision you took concerning me. Thank you for ensuring I never gave up in life despite the challenges I encountered.

To my daughter, Kukua, thank you for coming into my life and opening my eyes to the beauties and realities in life that I did not acknowledge.

To my late sister (Helen Rabiatu Ofosu), thank you for the support and sacrifices you made to ensure I got through my education.

Rest well big sis

To Abraham (Lee) and Aida thank you for your support and kindness.



Acknowledgement

All Glory, honour, and power to God. It is by Grace that I have come this far, I am grateful, Lord.

To Professor Jean-Paul Van Belle. Thank you for the time and effort you have put into grooming me and ensuring I completed this research despite the challenges I was going through. You became a father figure to me and filled that void I did not know existed in my life. Thank you for encouraging me to complete this research after I had my first child in 2020. You told me that my daughter deserved to have a mother with a Ph.D. and that was exactly what I needed to hear to put in my all.

Thank you, Sir.

Professor Ojelanku Ngwenyama, you ensured I ‘hit my head against the wall until there was no wall’. Prof Irwin Brown thank you for your support. Prof Wallace Chigona thank you for the monthly meetings and the support. Associate Prof Salah Kabanda, Associate Prof. Maureen Tenner. Dr. Pitso and Gwamaka Mwalemba thank you for the long but productive discussions. Ayanda Pekane and Zainab Ruhwanya, friends who have become family. Dr. Amoako, Priscilla, Alfred, Sarah, Tendani, Carl, Dr. Mwapwele, Dr. Hassa, Dr. Lusinga, Dr Akotam Agangiba, Grant, Rebecca, Sybil and Adu-sei.

UCT Doctorial Package, thank you for helping me financially on my Ph.D. journey.



Publications

Part of this thesis has been presented at conferences and has appeared in publications. This includes conference proceedings, report, and a symposium:

- Nuhu H., Van Belle J.P. & Turpin M. (2020). Social Enablers and Constraints Related to the Publication and Use of Open Government Data in a Developing Country. In *IFIP Advances in Information and Communication Technology*, Vol 601, (IFIP JWG, 10-11 Dec, Hyderabad), pp.86-101, Springer, Berlin. ISSN 1868-4238.
- Nuhu H. & Van Belle J.P. (2019). Assessment of the Public Value of Open Data in Ghana. African Conference for Information Systems and Technology (ACIST), 1-4 Aug, Addis Ababa, Ethiopia. ISSN 2467-8988. Available:
<https://digitalcommons.kennesaw.edu/cgi/viewcontent.cgi?article=1002&context=acist>
- Van Belle J.P. (Ed.). Africa Data Revolution Report 2018. Status and emerging impact of open data in Africa. UNDP/UNECA/WF/OD4D. Pp.1-98. Available from:
<http://webfoundation.org/docs/2019/03/Africa-data-revolution-report.pdf>
- IFIP Masters and Doctoral Symposium 2018 (Southern Africa Region): Best PhD presentation award.



Table of Contents

DECLARATION	I
DEDICATION	II
ACKNOWLEDGEMENT	III
PUBLICATIONS	IV
TABLE OF CONTENTS	VI
ABSTRACT	XIV
CHAPTER 1: INTRODUCTION	1
1.1 OVERVIEW	1
1.2 BACKGROUND OF THE STUDY	1
1.3 RESEARCH PROBLEM	3
1.4 SUMMARY OF THEORETICAL FOUNDATION	6
1.5 RESEARCH PURPOSE	6
1.6 RESEARCH QUESTIONS	6
1.7 EXPECTED CONTRIBUTIONS	7
1.7.1 CONTRIBUTION TO OGD RESEARCH	7
1.7.2 METHODOLOGICAL CONTRIBUTION	7
1.7.3 CONTRIBUTION TO PRACTICE	7
1.7.4 CONTRIBUTION TO THEORY	7
1.7.5 RESEARCH ASSUMPTIONS AND LIMITATIONS	8
1.8 LAYOUT OF THESIS	8
CHAPTER 2: LITERATURE REVIEW	10
2.1 INTRODUCTION	10
2.2 METHODOLOGY FOR LITERATURE REVIEW	10
2.2.1 SEARCH ENGINES USED	11
2.2.2 KEYWORD AND TITLE SEARCH ANALYSIS	12
2.3 CONCEPTUALIZING OPEN GOVERNMENT DATA	12
2.4 ADOPTION AND USE OF ICT	13
2.5 OGD PUBLICATION AND USE	14
2.6 OVERVIEW OF OGD RESEARCH IN DEVELOPING COUNTRIES	15
2.7 ACTORS AND OGD	17
2.8 OPEN GOVERNMENT DATA ECOSYSTEM	18
2.9 EMERGING ISSUES IN OGD	19



2.9.1 TRUST	19
2.9.2 TRANSPARENCY	19
2.9.3 PARTICIPATION AND COLLABORATION	20
2.10 DATA QUALITY	21
2.11 LEGAL FRAMEWORK	22
2.12 INTERMEDIARIES AND OGD	22
2.13 PUBLIC VALUE AND OGD	23
2.14 OTHER IMPORTANT CONCEPTS USED IN THIS STUDY	24
2.15 POWER	25
2.16 DATA OWNERSHIP	25
2.17 NETWORK CREATION AND ALLIANCE	27
2.18 DATA SHARING CULTURE	28
2.19 OGD INSTITUTIONALIZATION	29
2.20 SUMMARY	30

CHAPTER 3: THEORETICAL FOUNDATION

3.1 INTRODUCTION	31
3.2 THEORIES IN RESEARCH	31
3.3 CATEGORIZING THE USE OF THEORIES IN RESEARCH	32
3.3.1 DEDUCTIVE APPROACH TO THEORIES	32
3.3.2 INDUCTIVE APPROACH TO THEORIES	32
3.3.3 FIRST THEORETICAL LENS FOR THE STUDY	33
3.3.4 THE LEGITIMATION ACTIVITY MODEL (LAM)	33
3.3.5 THE PUBLIC VALUE FRAMEWORK	34
3.3.6 THEORY OF PRACTICE: HABITUS AND CAPITAL	35
3.4 CONCEPTUALIZING THE PROPOSED MODEL	35
3.5 SECOND THEORETICAL LENS	37
3.6 STRUCTURATION THEORY	42
3.7 STRUCTURES	44
3.8 AGENCY	46
3.9 STRUCTURES OF SIGNIFICATION	48
3.10 STRUCTURES OF DOMINATION AND POWER	49
3.11 STRUCTURES OF LEGITIMATION	49
3.12 THE USE OF STRUCTURATION THEORY IN IS RESEARCH	50
3.13 CRITIQUE OF STRUCTURATION THEORY	51
3.14 ADAPTIVE STRUCTURATION THEORY (AST)	52
3.15 ADDITIONAL THEORETICAL CONCEPTS	54
3.16 SUMMARY	55

CHAPTER 4: RESEARCH METHODOLOGY

4.1 INTRODUCTION	57
4.2 RESEARCH PARADIGM	57



4.3	INTERPRETIVE PARADIGM	60
4.4	LINK BETWEEN STRUCTURATION THEORY AND THE INTERPRETIVE PARADIGM	61
4.5	SUITABILITY OF THE INTERPRETIVE PARADIGM FOR THE STUDY	61
4.6	RESEARCH DESIGN AND METHOD	62
4.7	RESEARCH SCOPE	62
4.8	CASE SELECTION AND DATA COLLECTION	63
4.9	SECONDARY DATA SOURCES	66
4.10	TIMESPAN	66
4.11	ETHICAL CONSIDERATIONS	67
4.12	SUMMARY	67

CHAPTER 5: CONTEXTUAL BACKGROUND OF THE STUDY **68**

5.1	INTRODUCTION	68
5.2	OPEN GOVERNMENT PARTNERSHIP INITIATIVE (OGPI)	69
5.3	OGPI ACTIVITIES IN GHANA	71
5.4	DATA PUBLISHERS (DP)	73
5.4.1	GHANA STATISTICAL SERVICE (GSS)	73
5.4.2	NATIONAL INFORMATION TECHNOLOGY AGENCY (NITA)	74
5.4.3	GHANA'S OPEN GOVERNMENT DATA USERS (DU)	74
5.4.4	HIGH LEVEL REFLECTION OF THE DATA USERS (DU)	77
5.5	SUMMARY	77

CHAPTER 6: ANALYSIS AND FINDINGS OF SOCIAL FACTORS THAT INFLUENCED OGD PUBLICATION, USE AND PUBLIC VALUE CREATION **79**

6.1	INTRODUCTION	79
6.2	DATA ANALYSIS APPROACH	80
6.3	PROCEDURE FOR THEME GENERATION	81
6.4	THEMATIC ANALYSIS	81
6.5	DATA FAMILIARIZATION	83
6.6	INITIAL CODE GENERATION	87
6.7	SEARCH FOR THEMES	91
6.8	THEME REVIEWING	93
6.9	DEFINE AND NAME THEMES	98
6.10	REPORT PRODUCTION	102
6.11	SUMMARY	103

CHAPTER 7: EMPIRICAL FINDINGS AND ANALYSIS – SOCIAL CONSTRAINTS AND ENABLERS OF OGD PUBLICATION AND USE AND IMPACT/PUBLIC VALUE **104**

7.1	INTRODUCTION	104
-----	--------------	-----



7.2	STRUCTURE OF EMPIRICAL FINDINGS AND ANALYSIS	105
7.3	EMPIRICAL SCENE 1	105
7.3.1	OGD PUBLICATION	105
7.3.2	DATA OWNERSHIP	105
7.3.3	RELEVANCE OF DATA SOURCES IN DATA OWNERSHIP	107
7.3.4	COMPLEXITIES OF DATA OWNERSHIP	108
7.3.5	PERCEIVED SOLUTION TO THE COMPLEXITIES OF DATA OWNERSHIP	110
7.3.6	DATA SHARING CULTURE: UNWILLINGNESS TO SHARE	113
7.3.7	DIFFERENT PERSPECTIVE OF DATA SHARING: INTER-ORGANIZATIONAL COLLABORATION	114
7.3.8	CONTROLLING DATA	118
7.3.9	INSTITUTIONAL PERSONALIZATION	119
7.3.10	FEAR OF LOSS OF CONTROL	120
7.3.11	RIGHT TO ACCESS DATA	121
7.3.12	DATA QUALITY FROM THE PERSPECTIVE OF DP AND PS	124
7.3.13	IDENTIFYING DATA QUALITY VIA INSTITUTIONAL METHODOLOGIES	124
7.3.14	RESOURCES	127
7.3.15	HUMAN RELATED RESOURCES	128
7.3.16	TECHNOLOGICAL RESOURCES	129
7.3.17	FINANCIAL RESOURCES	130
7.3.18	REGULATORY MANDATE	132
7.3.19	INSTITUTIONAL REGULATIONS	133
7.4	EMPIRICAL SCENE 2: OGD USE	134
7.4.1	ALLIANCE/NETWORK CREATION	134
7.4.2	TYPES OF NETWORKS/ALLIANCE	136
7.4.3	NETWORK/ALLIANCE WITH PSs AND DPs	137
7.4.4	NETWORK/ALLIANCE AMONG DU	138
7.4.5	INTERNATIONAL NETWORKS/ALLIANCES	138
7.4.6	DATA COMMUNITIES AND DATA TEAMS IN NETWORK/ALLIANCES	139
7.4.7	DATA QUALITY	144
7.4.8	RESOURCES: TECHNOLOGY AND DATA QUALITY	148
7.4.9	MYTHS AND OGD USE	154
7.5	EMPIRICAL SCENE 3: IMPACT/PUBLIC VALUE	155
7.5.1	IMPACT OF OGD PUBLICATION AND USE	155
7.5.2	ECONOMIC IMPACT	156
7.5.3	QUALITY OF LIFE (SOCIAL) IMPACT	158
7.5.4	POLITICAL IMPACT	159
7.5.5	IMPACT ON ATTITUDES	161
7.5.6	SUMMARY	161
CHAPTER 8: DISCUSSION – THEORETICAL INTERPRETATION		162
8.1	INTRODUCTION	162
8.2	THEORETICAL PARTICULARIZATION	162
8.3	THEORETICAL INTERPRETATION	165



8.4	OUTLINE OF THEORETICAL DISCUSSION	166
8.5	ACTORS PERCEPTIONS AND ASSUMPTIONS ON SOCIAL CONSTRAINTS OF OGD PUBLICATION AND USE FROM THE LENS OF STRUCTURES OF SIGNIFICATION	167
8.5.1	DATA OWNERSHIP THROUGH STRUCTURES OF SIGNIFICATION	167
8.5.2	DATA QUALITY THROUGH THE LENS OF STRUCTURES OF SIGNIFICATION	169
8.5.3	DATA SHARING CULTURE THROUGH THE LENS STRUCTURES OF SIGNIFICATION	170
8.6	SOCIAL CONSTRAINTS OF OGD PUBLICATION FROM THE LENS OF STRUCTURES OF DOMINATION	170
8.6.1	DATA OWNERSHIP (<i>DATA AS A RESOURCE</i>) AS STRUCTURES OF DOMINATION CREATED AND RE-CREATED OVER TIME BY OGD ACTORS	171
8.6.2	TECHNOLOGICAL INFRASTRUCTURE AS STRUCTURES OF DOMINATION THAT IS CREATED AND RECREATED OVER TIME	172
8.6.3	HUMAN RESOURCE AS STRUCTURES OF DOMINATION CREATED AND RECREATED OVER TIME	173
8.7	SOCIAL CONSTRAINTS OF OGD PUBLICATION AND USE FROM THE LENS OF STRUCTURES OF LEGITIMATION	174
8.7.1	LEGISLATIVE MANDATE AS STRUCTURES OF LEGITIMATION CREATED AND RE-CREATED OVER TIME	175
8.7.2	INSTITUTIONALIZED NORMS AS STRUCTURES OF LEGITIMATION CREATED AND RECREATED OVER TIME	176
8.8	SOCIAL ENABLERS OF OGD PUBLICATION AND USE FROM THE LENS OF STRUCTURES OF SIGNIFICATION	177
8.8.1	NETWORK/ALLIANCES AS STRUCTURES OF SIGNIFICATION CREATED AND RECREATED OVER TIME	177
8.8.2	TECHNOLOGICAL RESOURCES AS STRUCTURES OF SIGNIFICATION	179
8.8.3	DATA SHARING CULTURE AS STRUCTURES OF SIGNIFICATIONS CREATED AND RE-CREATED OVER TIME	179
8.9	NETWORK POWER AS STRUCTURES OF DOMINATION CREATED AND RE-CREATED OVER TIME	180
8.9.1	TABLE 24: CASTELLS' CATEGORIZATION AND EVIDENCE FROM EMPIRICAL DATA	181
8.10	IMPACT OF OGD USE	181
8.10.1	ECONOMIC IMPACT	182
8.10.2	SOCIAL IMPACT	183
8.10.3	POLITICAL IMPACT	184
8.10.4	IMPACT ON ATTITUDES	185
8.11	SUMMARY	186

CHAPTER 9: CONCLUSION **188**

9.1	INTRODUCTION	188
9.2	REEXAMINING THE RESEARCH QUESTIONS	189
9.3	APPLICATION OF KLEIN & MYERS (1999) IN THE STUDY	191
9.3.1	THE PRINCIPLE OF HERMENEUTIC CIRCLE	191
9.3.2	THE PRINCIPLE OF CONTEXTUALIZATION	192
9.3.3	THE PRINCIPLE OF INTERACTION BETWEEN THE RESEARCHERS AND THE SUBJECTS	194



9.3.4	THE PRINCIPLE OF ABSTRACTION AND GENERALIZATION	194
9.3.5	THE PRINCIPLE OF DIALOGICAL REASONING	195
9.3.6	THE PRINCIPLE OF MULTIPLE INTERPRETATION	196
9.3.7	THE PRINCIPLE OF SUSPICION	197
9.4	CONTRIBUTION	198
9.4.1	CONTRIBUTION TO OGD RESEARCH	198
9.4.2	CONTRIBUTION TO METHODOLOGY	199
9.4.3	CONTRIBUTION TO THEORY	199
9.4.4	CONTRIBUTION TO PRACTICE	201
9.5	RECOMMENDATIONS	201
9.6	LIMITATIONS OF THE STUDY AND AREAS OF FURTHER RESEARCH	202
<u>REFERENCES</u>		<u>204</u>
<u>APPENDIX 1: SUMMARY OF CONTEXT AND DATA COLLECTION</u>		<u>231</u>
<u>APPENDIX 2: CASE SELECTION AND DATA COLLECTION</u>		<u>233</u>
<u>APPENDIX 3: EMPIRICAL OBSERVATIONS</u>		<u>234</u>
<u>APPENDIX 4: EXTENDED CODE BOOK BASED ON STRUCTURATION THEORY</u>		<u>236</u>
<u>APPENDIX 5: INITIAL CODES</u>		<u>240</u>
<u>APPENDIX 6: REVIEWED THEMES</u>		<u>210</u>
<u>APPENDIX 8: OGD IMPACT</u>		<u>230</u>
<u>APPENDIX 9: COVER NOTES AND DECLARATION OF CONSENT BY INTERVIEWEES</u>		<u>210</u>
<u>APPENDIX 10: ETHICS APPROVAL LETTER</u>		<u>210</u>



List of Tables

Table 1: Some research on OGD in Africa.....	16
Table 2: Contextualized meanings that actors attach to OGD (Gonzalez-Zapata & Heeks, 2015).	18
Table 3: Public Value Framework	35
Table 4: Procedure for Selection of Second Theoretical Framework (adapted from Eisenhardt, 1989)	38
Table 5: Some Constructs and the Explanation	43
Table 6: Summarized Assumptions of Interpretivist, Positivist, and Critical Realist Research Paradigms.....	59
Table 7: Data Sampling Table	65
Table 9: Phases of Thematic Analysis (Braun & Clarke, 2006).....	82
Table 10: Overriding Theme from the Collected Data	86
Table 11: Initial Codes.....	89
Table 12: Search Themes.....	92
Table 13: Coding for Theme Reviewing	96
Table 14: Explanation of Themes	98
Table 15: Data Ownership Coding References by Node	112
Table 16: Data Sharing Culture: Coding Referencing.....	116
Table 17: Control: Coding References	122
Table 18: Data Quality: Coding References for DPs and PSs	125
Table 19: Coding References for DP and PS on Resources	131
Table 20: Network Creation/Alliance: Coding Referencing	141
Table 21: Some Software Available for Data Users: Provided by interview participants.....	149
Table 22: Data Quality: Coding Referencing for DU	152
Table 23: Theoretical Interpretation and Particularization	162
Table 24: Castells' Categorization and evidence from empirical data	181
Scheme Table 29: Inductive Coding Scheme for OGD Publication and use.	223



List of Figures

Figure 1: Hermeneutic literature review	10
Figure 2: Conceptual Model for OGD legitimization in a developing country	37
Figure 3: Giddens' Structuration Theory	44
Figure 4: Underlying philosophical assumptions (Myers, 1997).....	58
Figure 5: Ghana Map	68
Figure 6: Code Output	81
Figure 7: Emerging Themes: OGD Publication.....	105
Figure 8: Plotting for Data Ownership.....	113
Figure 9: Plotting for Data Sharing Culture Code Referencing.....	118
Figure 10: Plotting for Control	123
Figure 11: Plotting for Data Quality: Coding Referencing for DPs and PSs.....	127
Figure 12: Coding References for DP and PS on Resources	132
Figure 13: Emerging Themes: OGD USE	134
Figure 14: Plotting for Network creation/alliance	142
Figure 15: Data quality coding referencing	153
Figure 16: Code Distribution via the Process of Deduction	165
Figure 17: Distribution of Codes occurrences	165



List of Acronyms

Acronym	Meaning
IS	Information Systems
OGD	Open Government Data
DU	Data Users
DP	Data Publishers
PS	Public Sectors
OGPI	Open Government Partnership Initiative
RTI	Right to Information
OP	Open Data
OG	Open Government
ST	Structuration Theory
NGO	Non-Governmental Organisation



Abstract

Implementing Open Government Data (OGD) increases a government's ability to share data on its activities with citizens in machine-readable formats. OGD also improves citizen participation, transparency, accountability and creates impact. By permitting more transparency, OGD helps citizens monitor government activities, which contributes to minimizing corruption. For example, while OGD enables governments to track the impact of their actions, it also gives citizens the ability to monitor government activities and critique where necessary. In addition, institutionalizing OGD by governments encourages economic growth and creates employment for citizens.

The aim of this study is to examine OGD as a phenomenon in Ghana by focusing on how social factors either constrained or enabled the publication and use of OGD in Ghana. The investigation also examined how these social factors were created and sustained over time, influencing OGD institutionalization. The Structuration Theory was used as the primary theoretical lens to aid in understanding these social factors. In addition, Structuration Theory was supplemented with concepts from Network Power, Ownership, and the Public Value Frameworks to provide additional theoretical categorization for the empirical findings. This study adopted a qualitative interpretive approach. Data sources for the research included semi-structured interviews, observations, and secondary data. The primary sources of data included Data Users, Data Publishers, Data "controllers," and beneficiaries.

The main findings from the study indicated that despite Ghana's long-standing democracy and being one of the early implementers of OGD, the phenomenon was yet to be institutionalized in the country. Data ownership, data quality, regulatory mandate, data sharing culture, control, and resources were the core social factors that influenced OGD publication. The meanings that actors ascribed to data ownership resulted in establishing and maintaining bureaucratic structures that allowed institutions and individuals to control available data. The actual use of OGD was influenced by social factors such as alliances/network creation, resources, power in networks, informal networks, and data quality assessment. Conversely, factors like alliances/network creation and technological resources acted as enablers that helped data users access the data. Data Users relied on technology and constantly drew upon their knowledge and understanding of technology and social connections to enable them to access and use data. They also relied on their ability to use technology to scrutinize data to ensure that it was of good quality and its use could create an impact or public value. Specific recommendations of



this study include the need to use change management strategies targeted at all actors and institutions in the OGD ecosystem; educating and sensitizing actors on the relevance of making data technically available on a single approved web portal; and the creation of a context-specific data quality indicators.



CHAPTER 1: INTRODUCTION

1.1 Overview

This chapter introduces the research by providing a background to the phenomenon of Open Government Data (OGD) as the progressive transition of e-government, democracy, and e-participation. This led to the inquiry into the socially constructed behavioral practices and patterns that influence OGD publication, use, and impact/public value creation in Ghana. The chapter presents the relevance of the context of the study, the problem statement followed by unearthing the gaps in OGD research to be addressed in this study. Next, a brief discussion of OGD in sub-Saharan Africa is provided. The chapter also introduces the theoretical underpinning of the research and its relation to the research paradigm and approach. Finally, the potential contributions and research boundaries of the research are presented.

1.2 Background of the Study

Data can enhance decision-making and create value. This has driven organizations and individuals to engage in data-driven activities (Loebbecke & Picot, 2015). This also triggered the demand for and growth in data published by governments globally (Máchová & Lněnička, 2017). Governments' response to publishing data is also slowly evolving towards the provision of a single data access point through the use of open data web portals and infrastructure (Lnenicka, 2015; Zuiderwijk, Janssen, & Davis, 2014).

The interactions between government, citizens, private, public organizations, and international organizations mostly result in the creation, processing, and storage of data (Srivastava & Theo, 2007; Tolbert, 2006). This is especially critical due to the integration of technology into government activities (e-government) (Alexopoulos, Loukis, & Charalabidis, 2016; Srivastava & Theo, 2007). The process of transitioning into and advancing e-government led to the birthing of the OGD movement, which both developed and developing countries have embraced (Jetzek, Avital, & Bjorn-Andersen, 2014; Zuiderwijk, Shinde, & Janssen, 2018). OGD is government or public data that is available, usable, reusable and accessible at the least cost possible. (Janssen & Zuiderwijk, 2014; Jetzek, Avital, & Bjørn -Andersen, 2016; Saxena, 2018).

From the legal point of view, OGD is typically backed by laws such as the Right to Information Act (Freedom of Information), Data Protection Laws, and Privacy Laws. The Right to Information or Freedom of Information has been broadly categorized into 'push' and 'pull'



legislation which is dependent on a country's tendencies to either react proactively or reactively to government information release or disclosure (Bennett, 1997; Xiao, 2010). The legislative part of OGD is seen as a challenge as most countries implement the OGD initiative before adequately considering the legal implications (Ali Hassan & Twinomurinzi, 2018). Technical openness stipulates the online availability and re-use of government data. OGD thus consists of promoting citizen participation, transparency, and collaboration (Public Sector Reform Secretariat, 2016).

OGD is "machine-readable data which is discoverable, available, and downloadable through dedicated internet portals without cost to potential data users" (Dawes, Vidasova, & Parkhimovich, 2016a; Okamoto, 2016; Ubaldi, 2013b). An essential aspect of OGD is its multiple stakeholder ecosystem; it consists of diverse data publishers and data users who attach different meanings to the concept because of their roles and views of data (Gonzalez-Zapata & Heeks, 2015; Ruijter, Grimmelikhuijsen, & Meijer, 2017). These stakeholders are often required to collaborate despite their differences in roles and views of OGD to enable effective implementation (Mungai & Van Belle, 2017). Datasets published by government are expected to be complete, of good quality and current (up-to-date) (Marijn Janssen, Charalabidis, & Zuiderwijk, 2012a; Ohemeng & Ofosu-Adarkwa, 2015; Anneke Zuiderwijk et al., 2018). The expected outcome of implementing OGD by countries across the globe is to create and generate public value (Harrison et al., 2012; Saxena & Muhammad, 2018). Public value is the benefit produced for citizens by public organizations. This is incorporated into the goals of public organizations (Harrison et al., 2012).

It has been argued that the tenets of OGD are associated with e-government and e-democracy (Chatfield & Reddick, 2018; Harrison et al., 2012). OGD, e-government, and e-democracy are targeted at developing and promoting citizen trust through participation, collaboration in policing, and decision-making processes. This collaboration includes profit and not-for-profit organizations to attain value by addressing social challenges (Chatfield & Reddick, 2018; Wirtz, Weyerer, & Rösch, 2017). Consequently, governments who engage in the OGD movement often join by signing as partners of the Open Government Partnership Initiative (OGPI) (Mungai & Van Belle, 2017; Sivarajah et al., 2016; Anneke Zuiderwijk et al., 2018). Being a signatory to the OGPI requires legal and technical openness, the development, and completion of Action Plans. Ghana joined the OGPI in 2011 and is considered as one of the OGD forerunners in Africa, alongside South Africa and Kenya.



Despite the country's completion of most of the Action Plans and having ensured to the extent that government data was both technically and legally open, research revealed some factors inhibiting OGD publication and use in Ghana. For example, World Bank reports have indicated that one major challenge of OGD in Ghana is data quality (World Bank Group, 2015, 2017). This has been affirmed by Verhulst & Young (2017) that data quality in developing economies was a challenge because of the scientific methodologies used from the start of the data cycle. Thus even though government data may be open, there is a challenge of the quality which influences both the publication and use of government data (Dawes & Helbig, 2010). Data quality encompasses 'validity'; confidentiality, privacy concerns, liability, 'completeness'; 'metadata'; 'technical' and 'semantic interoperability' (Chui, Farrell, & Jackson, 2014; Dawes & Helbig, 2015). Each concept is argued to have an influence on OGD publication and use. There has also been inadequate empirical research on Data Users (DU) in Ghana (Ohemeng & Ofosu-Adarkwa, 2015).

Findings from this study showed that the factors that influence OGD might include data quality; however, other underlying socially created patterns and practices affect the publication and use of OGD. These factors include data ownership, network creation, and different scientific methodologies.

1.3 Research Problem

The continuous movement from the non-technological nature of government activities to the inclusion of technology led to the birthing of different technology-enabled government concepts. Such concepts include e-government, e-democracy, and e-participation, more specifically, related to this research, Open Government (OG), Open Government Data (OGD), and Open Data (OD). These concepts led to the digital transformation of government activities across the globe. OGD is an initiative that requires signatory countries to make government data available in machine-readable formats on dedicated government web portals (Hassan & Twinomurinzi, 2018). Such data should ideally be at the least cost possible, usable and reusable, and legally open. Publishing government datasets on dedicated web portals is part of OGD implementation strategies to ensure a rise in transparency (Lourenço, 2016). Therefore, the internet is used as a channel to achieve and increase transparency; and increase citizen use and reuse of published data (Bertot, Jaeger, & Grimes, 2010).

OGD has attracted significant research by academics, policymakers, and practitioners in the past decade. Though these studies present different points of view in OGD research,



researchers have noted the need for contextualized academic research that focuses on identifying the underlying social factors that influence OGD publication and use (Golub & Lund, 2021; Safarov, Meijer, & Grimmelikhuijsen, 2017). How the social factors enable or constrain OGD publication, use, and public value creation (Harrison et al., 2012). The identified social factors might include behavioral patterns and practices or behaviors that influence the OGD publication and use. Notwithstanding the advantages of OGD (promoting accountability, citizen participation, and transparency), OGD has not been successfully institutionalized in many public sector institutions globally (Khurshid et al., 2020). Therefore, there is the need to theoretically investigate the factors that are negatively influencing the success of OGD.

The identification and recognition of the influence of social factors in IS research have been recognized as necessary since they are significant determinants of successful institutionalization of IS at the national and organizational level (Bernardi, 2018). For instance, the behavior and perception of organizational actors towards data ownership are regarded as important in various branches of IS research (Khan, Pervez, & Ghafoor, 2014; Mashhadi, Kawsar, & Acer, 2014). Issues concerning data ownership have been discussed in the context of the Internet of Things (Mashhadi et al., 2014), privacy and security in the cloud (Khan, Pervez, & Ghafoor, 2014), health care (Hopf, Bond, Francis, Haughney, & Helms, 2014), smart cities (Chowdhury & Dhawan, 2016) and Open Data applications research (Hielkema & Hongisto, 2013). Although the behaviour of organizational actors towards data ownership is relevant, such studies are lacking in OGD research. Research on network creation have been conducted in entrepreneurship and organizations research (Casson & Della Giusta, 2007; Greve & Salaff, 2003). This is, however, deficient in OGD research.

In addition, the emergence of OGD was expected to begin a new wave that could lead to the increased use of government data, citizen participation (e-participation), and curb secrecy in government activities (Ginsberg, 2013; Henninger, 2018). However, this has not been the case since governments globally have experienced either low usage of published data or low rates of usable government data publication (Wang, 2014; Wang & Lo, 2016). As OGD advocates the publication of government data on dedicated websites, the low publication and use may be related to factors that influence the use of government websites. These factors include

- (1) Website characteristics like usability, language, and evaluation of the website (Huang & Brooks, 2011; Youngblood & MacKiewicz, 2012).



- (2) The viewpoint of citizens or users-perceived risks, ease of use, usability, culture, and trust (Tolbert & Karen Mossberger, 2006; Patel & Jacobson, 2008). Research has noted the existence of differences in how officials of government and citizens perceive the nature, and usability of the website of the latter (Wang, 2014).
- (3) The process of evaluation that pertains to information\service quality, navigation system, information content/organization, laws, and technical factors (Luna-Reyes, Gil-Garcia, & Romero, 2012; Smith, 2001).

OGD researchers have echoed the call for a multiple stakeholder inquiry into contextual OGD factors that influence publication and use and value (Gascó-Hernández, Martin, Reggi, Pyo, & Luna-Reyes, 2018; Wang & Lo, 2016). Also, research has demonstrated the importance of conducting intellectual enquiry into OGD use despite its challenges (Marijn Janssen, Matheus, Longo, & Weerakkody, 2017). This is due to influence of OGD use on public value creation which is an essential part of the OGD movement (Jetzek, Avital, & Bjørn-Andersen, 2014). Thus the need for an enquiry into OGD and public value creation (Harrison et al., 2012; Jetzek, Avital et al., 2014). OGD demonstrates differing significant economic, cultural, social, and political qualities, which may account for the significant disparities in its implementation process across the globe (Zhao & Fan, 2021); such factors are worth investigating by researchers.

Ohemeng & Ofosu-Adarkwa (2015) revealed that it was essential to carry out empirical research of OGD in Ghana, especially research that addresses the existing DU gap. However, there still exists a paucity of contextualized research that focuses on how socially constructed behavioral patterns and practices influence the publication and use of OGD in the context of sub-Saharan Africa and created public value.



1.4 Summary of Theoretical Foundation

This research follows the interpretive tradition aimed at provide rich subjective explanations to social phenomena (Bernardi, 2018; Walsham, 1995). Following the interpretivist tradition enabled the researcher to interpret empirical findings from the perspective of subjectivity and the experiences of actors (Bernardi, 2018). This study is both descriptive and explanatory in nature.

Structuration Theory follows the interpretive tradition and provides a subjective explanation and understanding to social phenomena where institutions, rules, power relations, and similar structural constructs interplay with the social phenomena and actors of interest (Bernardi, 2018). Structuration Theory was used in this study as a theoretical lens to recognize the iterative and dynamic linkages amongst actors and social structures and how this influenced OGD publication and use in Ghana. However, the researcher acknowledged the limitations of the Structuration Theory; this led to the application of the concept of “interpretive flexibility” (Orlikowski, 1992, 2000).

Although Structuration Theory was chosen as the main theory for this research, contextual explanations from the empirical findings led to the inclusion of other theoretical views. These additions included Honoré’s (1961) theoretical explanation of ownership, Castells’ (2011) explanation of Network Power and Public Value Framework (Harrison et al., 2012). In addition, the infancy nature of OGD requires the application of contextualized and suitable theoretical frameworks that will enable both researchers and practitioners understand the phenomenon (Zuiderwijk & Janssen, 2013, 2014a).

1.5 Research Purpose

The purpose of this research is to investigate and understand *how socially created, and recreated patterns and behaviors of OGD publishers, users, and public sectors workers influence the publication and use of OGD in a developing country. It also seeks to understand the public value that have been created from OGD.*

1.6 Research Questions

1. What are the socially created patterns and behaviors that influence OGD publication and use in Ghana?
2. How do these socially created patterns and behaviors constrain and enable OGD publication and use in Ghana?



3. What is the public value created due to OGD publication and use in Ghana?

1.7 Expected Contributions

1.7.1 Contribution to OGD Research

This study addresses the lack of OGD research that takes a multiple stakeholder perspectives. It also aims to add academic knowledge on the social factors (behaviours and patterns) that influence OGD publication and use and how these factors constrain OGD publication or use. The research will shed light on the public value created due to OGD usage from the perspective of a developing country. The research also addresses the existing theoretical gap in OGD (Hassan & Twinomurinzi, 2018b; Harrison et al., 2012; Ohemeng & Ofosu-Adarkwa, 2015; Wirtz, Weyerer, & Rösch, 2017).

1.7.2 Methodological Contribution

This study provides an interpretive qualitative case study using Giddens' Structuration Theory. Honoré's explanation of data ownership, Castells' theoretical explanation of networks, and Harrison et al., (2012) Public Value Framework were used to help in categorizing the emerging themes.

1.7.3 Contribution to Practice

This research contributes to OGD practice by explaining to Ghanaian and African policymakers the importance of having a standard scientific methodology to aid the entire data life cycle. Having a standard scientific methodology will help policymakers and the OGD stakeholders address the challenge of data quality. Also, this research suggests to OGD policymakers to consider and attempt to understand the importance of socially created behavioral patterns and practices and their potential to either inhibit or enable OGD publication and use. This study further informs data publishers and public sectors on social factors constraining OGD publication and how the low publication is reducing the public value being created. Finally, this research informs policymakers of the different and somewhat contradictory national, organizational and international laws that guide the local OGD movement and the need to address these contradictions to ensure that datasets are technically and legally available.

1.7.4 Contribution to Theory

There are currently only limited theoretical explanations of the OGD phenomenon, with calls for a theoretical understanding of OGD from multiple stakeholder perspectives (Ali Hassan & Twinomurinzi, 2018b; Wirtz, Weyerer, & Rösch, 2019). This study contributes theoretically



to OGD research by using Giddens' Structuration Theory (ST), Honoré's explanation of data ownership, Castells' theoretical explanation of networks, and Harrison et al., (2012) proposed how public value from OGD use. These theories provided theory explanations to the empirical findings or data. The use of theories in this way is a recommended practice in IS research (Gregor, 2006).

1.7.5 Research Assumptions and Limitations

The data collection strategy used was one of the limitations. Although the researcher assumed data would be collected from individuals, the interview participants preferred group interviews due to time constraints. In addition, because some of the interview participants demanded to have to the interview guide and the proposal before the interview, the researcher observed they had predetermined answers for the questions. Some of the interview participants were not ready to answer follow-up questions. To this effect, their initial responses were considered as the actual answers to the interview questions.

Another limitation was the small sampling size. This was due the limited number of actors within the OGD ecosystem in Ghana. Furthermore, the subjectivity of the interview respondents influenced their responses. Their personal experiences influenced the subjective nature of the responses. These personal experiences were influenced by factors within and outside the organization. An example is the evidence of powerplay among the interview respondents during the group interviews. There were instances where the group leaders interrupted some group members during the interview session. In addition, some of the group leaders were quick to stop their members from responding to some of the questions. Reconciling the different worldviews during the data analysis stage also presented some limitations. The interview respondents had different interpretations and responses to the interview questions, which made reconciling the divergent views difficult. But follow-up interviews and the use of a qualitative software tool helped address this challenge.

1.8 Layout of Thesis

Chapter two presents the literature review on the phenomenon of interest. A discussion of the theoretical foundation follows this. Chapter three discusses the theoretical foundation and starts by explaining the theoretical lenses and how the researcher arrived at the new theories used to understand the phenomenon (that is, Structuration Theory, data ownership, network theory of power, public value framework Theory). Chapter four explains the research methodology. Chapter five presents the contextual background of the study. Chapter six presents the findings



and analysis of the empirical data for the study based on thematic analysis. This was followed by Chapter seven which presented the report production and analysis of the empirical findings based on the themes identified in the previous chapter. Chapter eight presents a discussion of the themes from the perspective of Giddens' Structuration Theory and the additional theoretical categorization explained in chapter three. Finally, chapter nine presents the conclusion of the study by re-visiting the research questions that motivated this study, interpretivist evaluation of the study, contributions of the study, the limitations, and areas for future research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review underlying this study. This chapter aims to use the systematic hermeneutic literature review approach to understand and review current literature on Open Government Data. The literature was then synthesized and analyzed established on systematic literature review methodology. The year range used for the literature search process was from 2009 to 2022 because 2009 marked the beginning of intensive research and practice of OGD across the globe (Coglianese, 2009; Ginsberg, 2013).

2.2 Methodology for Literature Review

The literature review followed the hermeneutic literature review process posited by (Boell & Cecez-Kecmanovic, 2014). It enables researchers to justify their claims to knowledge and add rigor to their search (Schryen, Wagner, & Benlian, 2015). Moreover, the application of hermeneutic literature review enables researchers to interpret and understand text in an iterative manner (Boell & Cecez-Kecmanovic, 2014). Searching for literature, analysis, and interpretation are integrated, thereby adding thoroughness to a study. A hermeneutic literature review follows the philosophy of interpretivism and is grounded on the principles of hermeneutic cycle.



Figure 1: Hermeneutic literature review

This literature review followed the interpretive philosophy, which is grounded on both the fundamental principle of the hermeneutic circle and hermeneutics (Geeling, Brown, & Weimann, 2016). Using the hermeneutic circle aids researchers in understanding both the parts and the whole of a research phenomenon (Boell & Cecez-Kecmanovic, 2014). The hermeneutic circle places importance on the emergence of shared meanings by understanding a phenomenon of interest based on its components and entirety (Freeman, 2014). This approach allows the researcher to observe and understand issues that emerge from the parts and their



effects on the whole (Boell & Cecez-Kecmanovic, 2014). These emerging issues may include previously established inclinations or suspicions which are not to be overlooked and misunderstood (Rowe, 2014; Guido Schryen et al., 2017).

Search words and specific research questions guided the literature review. The research questions were: (a) *What is the status of OGD research?* (b) *what is the status of OGD in both developed and developing countries* (c) *What are the factors that influence OGD publication and use in developed and developing countries* (d) What is OGD?

Using the following steps helped in the growing understanding and refinement of OGD literature systematically:

- (a) Selection of journals within and beyond the basket of eight (this included conference proceedings)
- (b) Search journal articles, books, and peer-reviewed conference proceedings by using titles and keywords. Peer-reviewed conference proceedings, books, reports, and dissertations were included to provide helpful directions to emerging research (Rowe, 2014; Guido Schryen et al., 2017).
- (c) Preliminary review and analysis of the abstracts, introduction, and conclusion of selected publications
- (d) Review of the entire selected publications for detailed analysis.

Although the process of reviewing literature was presented as steps, activities were carried out in an iterative manner. The process of iterating the steps was influenced by text interpretation and analysis.

2.2.1 Search Engines Used

UCT Primo, Google Scholar, and Web of Science were some of the online search engines used. Search words like Open Government Data*, Open Data*, Open Government*, Open Government Data in Developing Countries were used. Mendeley and Science Direct were also used to obtain relevant peer-reviewed publications for the study. Both Mendeley and Science Direct provided weekly updates on the publications relevant to this study based on search history.

Web of science provided the researcher with a unique search strategy that allowed queries and the extension of the databases for the literature search. The extension of the databases for literature search is a known and accepted practice in IS (Boell & Blair, 2019); this allows researchers to search for literature beyond the IS eight basket. For this study, the search query



produced 1054 peer-reviewed articles, which was then narrowed down to 940 based on their relevance to the current study.

2.2.2 Keyword and Title Search Analysis

The use of keywords and titles is essential for searching primary sources of literature (Rowe, 2014). Hence, keywords and titles were used to find key books, conference proceedings, journal articles and reports. This is an acceptable practice in the hermeneutic approach to conducting literature reviews because it enables a researcher to sieve through voluminous literature for relevant ones (Boell & Cecez-Kecmanovic, 2014). The primary keywords used in the search were Open Government Data, Open Data, Open Government, Ghana, public value, use, and publication.

2.3 Conceptualizing Open Government Data

OGD is associated with open data and open government. An amalgamation of these two terms gives rise to the concept of OGD (Sáez Martín, Rosario, & Pérez, 2016). While open data is the free, unrestricted access, use, and reuse of data (Kassen, 2013; Anneke Zuiderwijk & Janssen, 2014a), open government is an initiative undertaken by governments' to make data available on web portals with the aim of promoting transparency, accountability and increase collaboration with stakeholders (Albano, 2013; Bates, 2014). However, OGD should not only be linked to the availability of data on government web portals but be connected with the provision of data that has reusable capabilities (Robinson, Yu, Zeller, & Felten, 2009). The data should also be in machine-readable formats, primary, complete, timely, and accessible at the lowest cost and with an ability to create value (Jetzek et al., 2016). Also, OGD can be linked to the digitalization of government activities focusing on public institutions (González-Zapata & Heeks, 2013). Public institutions are built on their ability to institutionalize and enforce both informal and formal rules as well as sanctions (Scott, 2008). OGD is therefore embedded in public institutions that have institutionalized the use of technology (González-zapata & Heeks, 2013).

It has also been argued that the definition of OGD in literature has enumerated the significant pillars to include transparency, citizen participation, and accountability (Ohemeng & Ofosu-Adarkwa, 2015). The background of OGD can be traced to the United States 'Open Data Movement' (Ganapati & Reddick, 2012; Ginsberg, 2013; McDermott, 2010), which focused on disseminating government data for public usage and reuse. The foundational premise of OGD is based on the use of technology and its related infrastructure to enforce citizen



participation in governance, transparency, and collaboration through the use of datasets (Gonzalez-Zapata & Heeks, 2015). Though OGD research has evolved, the sustainability of the movement is dependent on employing different technological resources to enhance publication, use, and subsequently institutionalization (Gao, Janssen, & Zhang, 2021)

Data reuse can create economic and social value within the OGD ecosystem (Jetzek et al., 2016). To enhance decision-making by individuals, businesses, and other government institutions can use available data for both profitable and non-profitable purposes. Also, OGD is attributed to specific strategies that governments can adopt. These strategies include completeness, originality of datasets, timeliness, accessibility with minimum cost, web-based format, open standards, equal access, licensed, remains unchanged (Kučera, Chlapek, & Nečaský, 2013). The strategies governing OGD can determine the boundaries within which governments allow their data to be reused. For example, Czech Republic opted for completeness, accessibility, readable machine formats, open standards, and minimum usage cost of OGD by the demand side (Kucera & Chlapek, 2014).

2.4 Adoption and Use of ICT

ICT adoption and use in organizations have been attributed to internal and external contexts and content and processes (Caldeira & Ward, 2003). Factors attributed to the internal and external contexts of ICT adoption and use include resources, capabilities, intrinsic organizational relationships, technological environment, and market knowledge (Caldeira & Ward, 2003). Nevertheless, the context and process are related to the specific ICT being implemented, when it was adopted, and the series of activities that triggered its adoption and use in organizations. These factors have effects on the adoption and use of ICT by organizations. Other tenets of adoption identified in literature include security, complexity, skill, costs and modern technology, which affects attitude towards ICT while use is determined by compliance to government regulations and the mediums (email, internet) used to access information (Harindranath, Dyerson, & Barnes, 2008; Henderson & Yeow, 2012).

ICT adoption and use in government have led to various transformations in the public sector and the introduction of e-government, e-participation, e-procurement, smart cities, interoperability, and m-government. The infusion of ICT in government has redefined the multi-related interactions and transactions between government and different stakeholders (Bekkers & Moody, 2011). However, adoption and use of ICT in government initiatives across the globe is low and thus needs attention (Al-Hujran, Al-Debei, Chatfield, & Migdadi, 2015).



There is a need for inquiry into what is causing the low adoption rate of ICTs in the public sector while the opposite is experienced in the private sector. There is a gap concerning to ICT adoption and use between privately owned organizations and government technologically initiated services (Al-Hujran et al., 2015; AlAwadhi & Morris, 2008; Tondeur, Hermans, van Braak, & Valcke, 2008). For instance, the adoption and use of ICT in privately owned organizations are operative, whereas ICT in government is experiencing low adoption. Thus, citizens' adoption and use of e-government initiatives are influenced by socio-technical/political environment and triggered by voluntariness unlike private firms (Al-Hujran et al., 2015; Gupta, Dasgupta, & Gupta, 2008).

2.5 OGD Publication and Use

As part of the OGD movement, governments are required to publish data on data portals for use by citizens. However, how the data is interpreted and used may vary due to the diverse nature of datasets on the data portals (Lourenço, 2016). For example, in the quest to increase accountability by uncovering possible corrupt activities by public representatives, contract data was most used (Lourenço, 2016). Although OGD is grounded on electronically publishing government data, this has been challenged by inadequate organizational capabilities, the negative influence of organizational culture, and the absence of willingness to publish data (Janssen et al., 2012a; Yang & Wu, 2016). Additional are inadequate data publishing standards, inadequate technical skills, regulatory challenges, legacy systems, existing skills and knowledge gap in the data cycle and inadequate resources (Janssen, Charalabidis, & Zuiderwijk, 2012b; Zuiderwijk et al., 2014). Therefore, the success of OGD is dependent on data publishers' ability to identify the information requirements of the public and try to meet those needs (Crusoe, Gebka, & Ahlin, 2020).

It is usually assumed that OGD use and reuse is expected to create value by increasing data-related innovations and interventions (Gascó-Hernández et al., 2018). This is because OGD is expected to be made available and reachable in machine-readable formats, thereby making it user-friendly. The published data is expected to come with usable software packages, uniform resource identifies, and interoperability with other data sets to ensure effective and efficient use of OGD (Berners-Lee, 2009). However, due to inadequate technical proficiencies, limited published data, and inadequate training of users, the expected outcome is lacking (Gascó-Hernández et al., 2018; Janssen, Charalabidis, & Zuiderwijk, 2012). However, data quality is noted to be a common factor that affects both data publishers and users (Helbig, Nakashima,



& Dawes, 2012). Although data quality challenges affect all the stakeholders in the OGD ecosystem, an agreed method to address this challenge is still at large (Janssen & Zuiderwijk, 2014).

2.6 Overview of OGD Research in Developing countries

Several sub-Saharan African countries joined the OGD movement in 2011. Among the early signatories were Kenya, Rwanda, South Africa, and Ghana, although the actual levels of implementation have been low (Mutuku & Mahihu, 2014a). The shift towards open data in developing countries is influenced by politics, pressures from both internal and external bodies and reputation (Mutuku & Mahihu, 2014a). Rwanda and Kenya are considered the most advanced in open government data in Africa (Badiie et al., 2016). While this may be true, there are very few scientific publications in the region of sub-Saharan Africa. OGD research in sub-Saharan Africa has focused on licensing, trade policy and openness of the initiative in Kenya and Cape Town (Willmers et al., 2015, Musila & Yiheyis, 2015). A contextual analysis of OGD licensing in Cape Town and Kenya noted the need for a blend of standardized, bespoke licenses and additional personalized explanations. For example, Willmers et al. (2015) researched the policies governing the provision and access of data between the supply (providers) and demand sides (users). Afful-Dadzie and Afful-Dadzie (2017) analyzed OGD web portals of five different African countries, while Ohemeng and Ofosu-Adarkwa (2015) conducted a document analysis of OGD in Ghana. Mutuku and Mahihu (2014), focused on the technological challenges that may affect the use of OGD by intermediaries in Kenya. The table below provides summarizes research on ODG in sub-Saharan Africa.

Table 1: Some research on OGD in Africa

Author	Methodology	Theory/conceptual framework	Focus/gap	Context
Ohemeng and Ofori-Adarkwa (2015)	Qualitative-document analysis	None	The decline of trust and need for OGD. OGD needs to focus on both the institutional and citizen perspectives	Ghana
Afful-Dadzie and Afful-Dadzie, (2017)	Traditional conjoint analysis	Elicitation model	Content analysis of websites and role of media professional in open government	Five (5) African Countries
Willmers et al. (2015)	Interviews and desk evaluations	None	Licensing or laws of open data.	Kenya and Cape Town
Mungai and Van Belle (2017)	Descriptive qualitative	Actor-Network Theory	Understand the interest and communication between the various actors of open government data	Kenya
Mutuku and Mahihu (2014)	Mixed method	None	Challenges of technological intermediaries	Kenya
(Afful-Dadzie & Afful-Dadzie, 2017)	Topic Modeling, text, and document analysis	Comparative survey conceptual framework	Review on Freedom of Information in OGD research	None
(Mungai, 2018)	Critical realism-a qualitative method	Six-step framework	Causal mechanisms the influence OGD institutionalization.	Kenya

Table 1 shows the paucity of empirical research in sub-Sahara Africa and the need for an empirical contextualized systemic multiple stakeholders focused research in OGD (Magalhaes & Roseira, 2017; Mutuku & Mahihu, 2014a; Pugh, 2016; Wirtz, Weyerer, & Rösch, 2017).

The idea of openness was restrictive and led to debates by open data activists about the degree to which a country can be open or transparent. Opening public sector administration data generates e-participation and creates room for accountability and transparency in governance.



OGD in developed countries is further advanced compared to developing countries. Open data web portals in developed countries had large or meta datasets (Dawes, 2010). These web portals usually are updated more frequently to make them usable by citizens. Citizens' participation on these platforms is also high (Mergel & Desouza, 2013).

2.7 Actors and OGD

Actors are vital figures in the OGD initiative and are considered essential within the OGD ecosystem. These actors/stakeholders constitute the supply and demand sides of the OGD ecosystem (Ohemeng & Ofosu-Adarkwa, 2015). In this study, actors represent all the participants in the OGD ecosystem (both supply-side and demand-side). For instance, in Kenya, the actors identified in the open data initiative were crucial representatives of government and international donor partners (Mungai & Van Belle, 2017). Primary actors have the role of supplying or publishing data to the other stakeholders in the OGD ecosystem. For instance, public administrators in this study are considered those who constitute the “*supply-side*” of OGD. Nevertheless, data journalists, bloggers, and NGOs are considered stakeholders who constitute the “*demand-side*” of the OGD ecosystem. There have been some studies on actors and OGD, although empirical studies are limited in sub-Saharan Africa. Therefore, the need to unearth issues surrounding the adoption and use of OGD remains. Actors are discussed based on their roles as either demand or supply sides of OGD and in their various professional endeavours that make them rely on OGD. Actors attach a different meaning to OGD based on their context. Gonzalez-Zapata and Heeks (2015), from a socio-technical standpoint, noted that the meaning actors attach to OGD is shaped by contextual factors, interest, and power. This was further affirmed by Mungai and Van Belle (2017), who noted the evidence of cooperation between different actors with different interests in the supply-side to achieve a common goal (OGD in Kenya). Table 2 provides a summary of the meaning's actors/stakeholders attaches to OGD:

Table 2: Contextualized meanings that actors attach to OGD (Gonzalez-Zapata & Heeks, 2015).

Perspectives	Nature	Drivers and benefits	Actors/Roles
Bureaucratic	Underpinned by government processes, strategies, and regulatory policies	Ensuring efficient and effective delivery of public sector data	Civil servants; operational ICT staff
Technological	Government-driven technological inventions	The enhanced infrastructure of government data	Design and operational ICT staff
Political	Right to Information or data	Improvement of transparency, accountability, empowerment, and participation in governance	Citizens: users and beneficiaries
Economic	Generating economic value based on data	The creation of economic value via new products, services, revenue, profits, and jobs	Private firms and entrepreneurs: users and beneficiaries

Actors include public administrators, bloggers, NGOs, academic researchers, data journalists and beneficiaries (Gonzalez-Zapata & Heeks, 2015). Mutuku and Mahihu (2014) suggested in a study done in Kenya that citizen participation can be improved through increased awareness, institutional collaboration, and response-driven feedback systems. Jetzek, Avital, & Bjorn-Andersen (2014) also that mobile platforms could enhance government-citizen collaboration in OGD in Ghana. In addition, initiatives of e-government such as OGD should consider the opinions and interpretation of citizens (Janssen, Charalabidis, & Zuiderwijk, 2012). Nevertheless, how citizens understand and use available data can be challenging (Meijer, 2013), as there is a possibility of interpreting data differently. There is, therefore, a need for in-depth demand-side focused research on OGD (Wirtz, Weyerer, Thomas, & Möller, 2017).

2.8 Open Government Data ecosystem

Actors in the OGD ecosystem interdepend on each other, this is evident from the data collection stage, publication use and value creation. The involvement of actors are categorized as either data publishers or users (Bonina & Eaton, 2020; Ohemeng & Ofosu-Adarkwa, 2015). The OGD ecosystem involves both internal and external actors with varying responsibilities. Governments play major roles in OGD initiatives by providing the data, encouraging the



various actors in the ecosystem to provide and make use of data (Dawes et al., 2016a). A comparative study in New York and St Petersburg revealed different results in an open government ecosystem. New York noted that the link between the government and technologically oriented actors could be enhanced through co-creating joint open administration within the ecosystem. Meanwhile St Petersburg needed a more intelligent type of engagement with prospective end-users in order to support distribution and reuse of available data via specialized government advancements (Dawes et al., 2016a). In addition, laws on open data need to consolidate all the actors/stakeholders within the ecosystem to encourage dispersion and advancement of the initiative (Dawes et al., 2016). The OGD ecosystem may further comprise of elements that are socio-technical in nature. These socio-technical components include context, reasons for adoption, strategies, and policies of OGD, dataset publication, use and reuse of data, benefits of OGD and availability of communication and feedback system (Dawes, Vidasova, & Parkhimovich, 2016).

2.9 Emerging issues in OGD

This section presents a discussion on some emerging issues in the literature on OGD. Namely, trust, transparency, and quality. Other emerging issues that have not been discussed include legal framework, intermediaries, and public value in developing countries.

2.9.1 Trust

The tendency for people to use services delivered by online portals is dependent on the level of trust developed between the end-user and the provider. The trust relationship can be developed through the provision of real-time information channeled towards end-user needs, access to services at a minimum charge in relation to money, time, and security confidence (Gilbert, Balestrini, & Littleboy, 2004). In the case of OGD, data is disseminated using data web portals. Thus when the trust relationship between the government and citizens is challenged, adoption and use of online services can be a barrier. McKnight and Vivek Choudhury (2002) noted that institutional environments could affect citizens' trust and perception of safety, which is also informed by available structures and legal frameworks.

2.9.2 Transparency

Transparency is another emerging issue in OGD adoption and use. It enables citizens to use government data available on the web portals. The concept is often seen as one of the tenets of openness (Davies & Perini, 2016). Transparency in OGD is grounded on the principle of disclosure, that is, making government activities including data/information available to



citizens (Chun et al., 2010). The principle of transparency in OGD implies the quick exposure of relevant and accurate information to citizens by the various agencies of government. Embedding the concept of transparency into e-government is intended to make corruption less attractive and promote openness. Achieving transparency in OGD is not merely determined by the downloading of datasets (Harrison et al., 2012) but also linked to reliability and citizens' ability to create value from the dataset. However, data filtering can impede transparency since relevant issues can be hidden.

Studies have noted that social media can be one of the ways to achieve transparency and encourage participatory e-government due to the socio-interactive nature of the platforms (Bertot, Jaeger, & Hansen, 2012). However, a different view of the use of social media in e-government has raised the concern that social media is mostly used for rating purposes (Chun, Shulman, Sandoval, & Hovy, 2010). An essential part of promoting OGD is data transparency which is attained through the development and maintenance of government-approved data portals (Lourenço, 2016).

2.9.3 Participation and Collaboration

Participation and collaboration between government and citizens is considered essential because of its tendency to promote development. However, with the introduction of technology into government activities inter-government and citizen collaboration and participation is mediated by technology. Citizen participation in government activities results in quality and improved decisions and effectiveness (Chun et al., 2010). Though electronic participation is considered to be useful in e-government, it has not received much attention in research (Karlsson, Holgersson, Söderström, & Hedström, 2012). Electronic participation by end-users in e-government services is challenged by inadequate skills, vague end-user segmentation and description of types of participation (Karlsson et al., 2012). This principle of OGD requires teamwork and partnership between the different actors within the OGD ecosystem (Chun et al., 2010); the actors include government agencies, citizens, Non-Governmental Organizations (NGOs), and nonprofit organizations. Such partnerships lead to OGD publication use and public value creation. The success of OGD initiatives is dependent on engagements that are led by citizens (Purwanto, Zuiderwijk, & Janssen, 2020).

2.10 Data Quality

Data quality plays a crucial role in a society where technology is a mediator in various interactions. In e-government quality is an important determinant for effective and efficient citizen participation in government activities. For example, visual displays and content of websites impacts on quality and increases citizen usage behaviour (Gilbert et al., 2004). Thus rich graphical and visual content of web portals is viewed as a determinant of e-government adoption by citizens (Gilbert et al., 2004). The quality of e-government initiatives can be categorized into two. That is, service and technological quality. Service quality in e-government can be viewed from either the technical or the functional outlooks. The technical perspective is geared towards the delivery of the service, while the functional perspective is about the process used to convey or communicate the services and different levels of access by end-users (Alawneh, Al-Refai, & Batiha, 2013). Technological quality is determined by timely feedback, updates and efficacy of the platform (Rust & Lemon, 2001). Trust in online activities is linked to the quality of the platform as well as the information (McKnight, Vivek Choudhury, 2002). Quality is often a challenge in terms of data accessed by citizens. Data quality is defined by precision, excellence, task fitness, usefulness, accessibility, and context-specific (Dawes, 2010, 2018).

Though research has found people's perception of OGD service quality to influence trust, the perception of people towards OGD data quality is seen to be more critical to confidence in OGD (Purwanto, Zuiderwijk, & Janssen, 2020b). Data quality is usually seen as the readiness of data that can lead to usage or how present data trigger usage (Juran & Godfrey, 1999). The concept of data readiness or fitness for use is dependent of available dataset and can be seen from both objective and subjective perspectives (Pipino, Lee, & Wang, 2002). The objectively data quality can be assessed dependently or independently of a task at hand (Attard, Orlandi, Scerri, & Auer, 2015). Data quality is assessed independently when there is a non-existence background understanding of data usage; the task assessment is considered as the most important. Conversely, dependent task assessment mirrors the prerequisites of the current purpose (Attard et al., 2015). Subjectively data quality mirrors data users' knowledge, experiences, and needs.

From the perspective of openness, in order to encourage reuse of available datasets by DU in the ecosystem, providing quality data is essential (Helbig et al., 2012). Data quality challenges may lead to added costs, DU encounters (Kim, 2002; Vetrò et al., 2016a). Organizations that



rely on data as a core resource depend on quality data for the organization's progress, includes OGD use (Even & Shankaranarayanan, 2009; Zuiderwijk & Janssen, 2015). Data quality is essential in the OGD ecosystem thus to ensure the quality of datasets measurements such as accuracy (error-free), understandability (through the provision of metadata), completeness (data domain and type), and traceable (constant updates) (Vetrò et al., 2016a). DU interprets data in different ways before use. DU interpret data in different ways before use. The interpretation is influenced by available organizational resources and data combinations (Ferro & Osella, 2013).

2.11 Legal Framework

Right to Information legislature provides the legal foundation for OGD globally (Banisar, 2004). This leads to healthy decision making; removes tedious democratic processes to data acquisition by individuals, businesses, and government agencies. However, whilst the legal framework can be beneficial, it may also pose challenges to the OGD. For instance, a legal framework can provide legal grounds for openness but typically does not deal with inevitable challenges that can be encountered as a result of 'openness' (Zuiderwijk, Janssen, Choenni, Meijer, & Alibaks, 2012). For example, the law does not address the misinterpretation of data by the demand side. Therefore, legal frameworks should focus on both demand and supply sides of OGD. Other legal frameworks that guide OGD include government statistical legislation, data protection laws, copyright, and privacy laws. Besides the Right to Information Act which is currently a law in Ghana that supports OGD, the country also has other laws that provides legal foundation for OGD. For instance, there is the Data Protection Act, Statistical Service Law 135, and the Copyright and Privacy laws of Ghana.

2.12 Intermediaries and OGD

Intermediaries play an important role in e-government initiatives (Sein & Furuholt, 2012). They enhance democracy, reduction in corrupt activities and provide different e-government activities (van Schalkwyk, Cañares & Chattapadhyay, 2012). However, they vary in terms to their access to data and communication strategies with stakeholders of OGD (Janssen & Zuiderwijk, 2014). Intermediaries are responsible for conveying information between two or more parties, in the context of OGD it is between government and citizens. A study of intermediaries in public universities in South Africa' on open government data revealed that personalized links/ social engineering was used to acquire data from government to end-users (van Schalkwyk, Willmers, & Czerniewicz, 2014).



Thus, intermediaries have the capacity of understanding published government data. Intermediaries from the perspective of business models include “single-purpose apps, interactive apps, information aggregators, comparison models, open data repositories and service platforms” (Janssen & Zuiderwijk, 2014). Intermediaries are relevant in the open data ecosystem by enabling easy flow of data between government and citizens, hence the need for more than one intermediary (van Schalkwyk, et. al., 2012; Sapsed, Grantham, & DeFillippi, 2007), however the role intermediaries is built on created trust.

2.13 Public Value and OGD

Public value refers to creating benefits to citizens and other stakeholders in society (Harrison et al., 2012; Moore, 2014). Researchers have posited that Public value would lead to public sector accountability and citizen participation (Alford & O’Flynn, 2009; Hartley, Alford, Knies, & Douglas, 2017) or innovative activities by the suppliers of OGD (Baack, 2015; Harrison et al., 2012; Mutuku & Mahihu, 2014). However, other studies have noted the need to create public value by public administrative institutions, as they are equipped with the required amenities (Bryson, Sancino, Benington, & Sørensen, 2017). Although public value creation is deemed as necessary, a scintilla of uncertainty lies within its scope due to the difference between public expectations (wants, needs) and created public value (Benington, 2009). This makes the process of identifying public value puzzling (Garcia, Wigger, & Hermann, 2019; Jørgensen & Rutgers, 2015) and may lead to failure (Bozeman, 2002).

The public value of any government initiative is attained after an intensive performance measurement is undertaken. The continuous use of data by the public is regarded as an essential end in the OGD life cycle (Crusoe, Zuiderwijk, & Melin, 2020). To create a situation where OGD can become an essential utility is to substitute current data provision structures with OGD (Crusoe, Zuiderwijk, et al., 2020). In Sri Lanka, the non-existence of evaluating mechanisms to assess e-government initiative performance has clouded the relevance of public value (Karunasena & Deng, 2010). The public value of OGD can be measured from either substantive or ideological tendencies such as quality of life, economic and intrinsic enhancements (Harrison et al., 2012). It has been argued that legitimation can lead to the creation of public value through common understanding (McGregor, 1997; Moore, 1995).

Data provides prospects for an increase in creativity, innovation, and learning when the context, complexity and transformative power is taken into consideration (Ojo, Curry, & Zeleti, 2015). For instance, data journalism has led to a positive but challenging shift in journalism due to its



creativity, innovative capacity, and public value creation (Parasie & Dagiral, 2013). Creating public value based on the use of data is essential and identifiable from the perspective of customer-driven approaches and initiatives. In this study, the customer-driven approach is analyzed from the perspective of the DSs of OGD, who use the government data to create public value. Thus, the creation of value from data, is the shared and mutual responsibility of various stakeholders within the data ecosystem via innovation (Jetzek, Avital, & Bjorn-Andersen, 2014b; Kubler, Robert, Neumaier, Umbrich, & Le Traon, 2018). Consequently, the multi-stakeholder nature of the OGD ecosystem, opens up the debate for the creation of value for the public good (Harrison et al., 2012). However, there is some complexity in value creation within open innovations, such as OGD (Jetzek et al., 2016) due to its multi-stakeholder ecosystem (Alexopoulos, Zuiderwijk, & Charapabidis, 2014; Durmusoglu, 2004). Although this complexity is evident, there is a need for open innovations to create value for the public through collaborative innovations (Clauss, 2017). Hence, DP's publication of OGD and DS's use of this data can be a way of fostering innovation and value creation for the public (Harrison et al., 2012; Ubaldi, 2013b). There is, consequently, evidence of the need to create public value, but such empirical research on OGD is limited in developing countries. This study offers a response to this research gap.

2.14 Other Important Concepts Used in this Study

One critical factor to consider in OGD is the movement from closed to open structures and the associated complexities, which form the backbone of OGD (Smith & Reilly, 2013). Openness creates a system of participatory governance between government and citizens through a double loop (two-way) communication process (Arzberger et al., 2004; Janssen et al., 2012) coupled with unknown and uncontrollable external environmental complexities. OGD provides the means by which citizens can have access to government data electronically and attach personalised interpretations to it (Chun et al., 2010b). The understanding associated with data can be critical as it is not devoid of personal biases and contextual differences. OGD also demands real-time communication and response or feedback, which is mostly a challenge due to the timeliness of datasets and how data is interpreted (Lee & Kwak, 2012). On the other hand, closed structures are traditional and devoid of any external intricacies. Thus activities are controlled within such environments. This gap reveals the need to empirically investigate OGD from the perspective of both demand and supply sides with regards to the legitimization process.



2.15 Power

The concept of power has been understood and used from both recognized and unofficial perspectives. The recognized interpretation of power is exercised and often associated with authoritative positions, while unofficial power is exercised as a legitimation criterion (Barnes, 1986; Weber, 1999). From Giddens' perspective, actors' exercise of power is based on their use of allocative and authoritative recourses, which places responsibilities on the actors to achieve results. The nature of power is 'dual structure', that is, power both constrains and enables actors (Giddens, 1984) and this is manifested in the use of resources. In addition, power can be used as a means of domination or liberation (Giddens, 1984).

The significance of understanding the role of power in Information Systems cannot be understated. Power is used by actors (users and IS developers) to influence activities of each other (Silva, 2007). The process of information dissemination and control among actors in organizations unearths how power is distributed within the organization (Bariff & Galbraith, 1978); how actors acquire this power determines how they disperse.

However, from the epistemological stance the study of power in Information Systems is seen as a challenge due to the concealed constitution and complexity of politics and power. This complexity can be resolved through the use of a methodology that is epistemologically grounded as it provides an interpretation of meanings and activities (Silva, 2007). Consequently, (Silva, 2007) advocated for a theoretical understanding of power from an interpretivist perspective grounded on the sociology of technology as political science.

The interpretivist conceptualization and interpretation of power relations among actors in an IS ecosystem requires a combination of different theories (Silva, 2007). This is due to the routinization of IS by actors in an organization, which unravels different notions of power (Silva & Backhouse, 2003). Actors' routinization of Information Systems is linked to behaviors; and such behaviors within time become automatic and an acceptable habit (Limayem, Hirt, & Cheung, 2007).

2.16 Data Ownership

The concept of ownership has been considered an inconsequential subject due to its complex nature (Van Alstyne, Brynjolfsson, & Madnick, 1995). However, understanding the concept of ownership is regarded to be equally important as the acquisition of technical skills, education, finance and infrastructure (de Beer, 2017) in the era of openness.



Data plays a critical role in organizations' efficient and effective operation (Malgieri & Custers, 2018). The essence of incorporating IS in organizations is about data interoperability, making quality data and information available in the correct form, at the right time to the right person (Collins et al., 2007). However, data and information sharing in organizations has been described as challenging in spite of the almost ubiquitous use of IS (Bilykh et al., 2003; Hart, 2002).

An adequate understanding of the behavior of data sharing is dependent on actors' understanding and perception of data ownership (Hart, 2002). An organization's perception of data ownership influences critical decision making such as IS outsourcing, centralization or decentralization (Van Alstyne et al., 1995) success of IS in organization is determined by the perception of ownership. There is significant complexity surrounding data ownership which is linked to the roles of actors in the Open Data ecosystem (Hielkema & Hongisto, 2013). Changes and complexities in data ownership occur when organizations move from decentralized, paper-based systems or semi-integrated systems to centralized ones. For example, when organizations move from decentralized to centralized IS, data was still captured at the departmental level, however, the data in the centralized system changes ownership (Van Alstyne et al., 1995), and this creates complexities that are yet to be addressed.

Although the concept of data ownership is regarded as an essential theme in the era of openness, research has thus far focused less on this theme (de Beer, 2017). Especially with OGD, where structures have been created and recreated over time. However, studies have regarded data ownership as a challenging concept that needed to be addressed in the open society, where large amounts of data are being accumulated from different sources (Khan & Hamlen, 2012; Mashhadi et al., 2014).

Due to the challenge of theoretical principles of data ownership in OGD, this study adopted the theoretical principles governing ownership as presented by (Honoré, 1961). This theoretical principle of ownership was used in this study due to its explanation and perception of ownership from the perspective of the interview expounded in the analysis and empirical elaboration. Honoré (1961) categorized ownership into: (1) 'the right to use whatever is owned'; (2) 'the right to control the use of whatever is owned'; (c) 'the right to remain in control of what is owned, without interference from others.



2.17 Network Creation and Alliance

Networks are created socially through the interaction between actors in and between organizations for specific purposes. Networks are created through social interaction between actors in an organizational unit and between organizations (Tsai & Ghoshal, 1998). Actors play different roles and occupy different authoritative positions in the networks that are created (Tsai & Ghoshal, 1998); 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 involved in the social connection and interaction (Hansen, 1995; Katz & Gartner, 1988). Research on network creation by actors within organizations has argued that organizational success is dependent on such network, due to the role networks play in making resources available to participatory organizations (Jenssen & Koenig, 2002). Through social interaction, participating actors in a network can plan and hold discussions on a series of activities that may contribute to the success of the organizations (Haugh, 2007).

From a knowledge management perspective, networks can be created for the purpose of transferring tacit knowledge and creating novel knowledge, which organizations depend on for future endeavors and transfer of learnt skills (Bergman, Jantunen, & Saksa, 2004). These are referred to as 'knowledge' networks (Bergman et al., 2004). In the 'knowledge network' organizations ensure a repository of both explicit and tacit knowledge are created as also spread among all actors in the organization (Miller & Waller, 2003). From the perspective of entrepreneurship, networks influence networking time and number of participants engaged in a discussion or dialogue (Greve & Salaff, 2003; Jenssen & Greve, 2002). Due to the social nature of networks, members of families and friends are sometimes involved (Haugh, 2007). Organizations also create virtual networks, which may consist of a collection of actors within and between organizations in the same context or different contexts (Bergman et al., 2004).

Although different disciplines networks have studied network creation and networking due to its significance in the success of organizational plans and purposes, research in OGD has thus far paid limited attention to it. This study, however, hopes to foreground the role of network creation as a factor in the use of OGD by Data Users. Networks can be created for reasons such as funding support, international exposure, determination of data quality and access to data. Data Users create networks through social interaction birthed from social networks (example, friendship, colleagues).



Control in Information Systems is often associated with having data in one location and access granted to the right people. The concept of control in IS research and practice acknowledge the importance of centralized control. The essence of centralized control results in standardization and ensuring that the integrity of data was kept (Van Alstyne et al., 1995). Findings from this study revealed that actors in the OGD ecosystem attempt to control data in its decentralized format. The perception around centralizing data was seen as taking away data control from those perceived to be the “actual controllers”.

The quest to achieve different objectives and gain competitive advantage drives organizations to create alliances (Adelson, 1999; Monge et al., 1998). Alliances can be described as the formation of collective networks between and within organizations by actors (Gulati, 1995). Research has posited that organizations join alliances as a legitimation criterion, learn norms, tacit and explicit knowledge (Van den Abbeele, 2016). Alliance creation by organizational actors is critical to the success of organizations. For example (Ngwenyama & Nørbjerg, 2010) posited that in the face of nonexistent top management support for the implementation of IS, alliance creation was a driver of success. Alliances are formed by organizational actors within and between organizations (Rottman, 2008). The formation of alliances is influenced by social capital and the use of material and non-material resources by organizational actors. Communal networks are created within these alliances are driven by social interaction between organizational actors. These coordinated networks enable actors access each other’s abilities and reliabilities.

2.18 Data Sharing Culture

A single acceptable definition of culture is still lacking in literature, there varying meanings ascribed to culture (Straub, Lock, Evaristo, Karahanna, & Srite, 2002). One definition of culture is ‘a way of life’, and commonly accepted valued and practices are shared and exhibited by members of a community (Straub et al., 2002, p. 18). Culture is explicitly expressed and interpreted by people through beliefs, values, practices and actions (Tanner, 2009). The meanings people assign to these beliefs, values, practices, and actions are routinized and become communally acceptable over time. The right cultural values, beliefs, practices, and procedures are considered to be fertile grounds for successful IS implementation (Ruppel & Harrington, 2001).

The phenomenon of culture can be understood and analyzed from different perspectives. These perspectives include organizational culture, national culture, group and individual culture



(Hofstede, 1980a; Linstead & Grafton-Small, 1992; McCoy, Galletta, & King, 2005). From a national or group perspective (Hofstede, 1998) culture is a distinguishing factor between members of a group. From the organizational perspective, culture entails a collective interpretation and understanding of symbols, practices, norms, values, and beliefs (Hofstede, 1980b). The use of IS individuals is achieved through its assimilation and adaption into known cultural practices of end-users (McCoy et al., 2005). For example, the emergence of the open data movement led to the assimilation of technological tools to aid in the both the publication and use of government data. Including advanced technological innovations/tools in OGD platforms may increase usefulness and usability (Ansari, Barati, & Martin, 2021).

Culture is regarded as a critical tenet in the successful implementation of IS in organizations. The culture of care and trust, advancement and adaptability, strategies and management of data are critical for successful implementation of IS in organizations (Ruppel & Harrington, 2001). Data sharing culture is understood as an organization's willingness to share data or information (Ubaldi, 2013). In the era of openness, data culture and data sharing culture vary across countries. For example, in Europe data culture and data sharing culture were linked with different laws that governed OGD publication and use (Ubaldi, 2013). In Australia it was related to citizen engagement and openness as a culture (Alanazi & Chatfield, 2012). In this study, the issues of data culture and data sharing culture were associated with a generational transition of values, rules, infrastructure, perceptions, and ideologies and individual and institutional control of 'government data'.

2.19 OGD Institutionalization

Institutionalization refers to the process of routinizing cultural practices, rules, and norms (Mekonnen & Wubishet, 2016). Institutionalization thus attempts to explain how institutional rules, traditions, and norms become accepted or rejected in a social system or structure (Avgerou, 2000). Institutionalizing OGD practices and policies into public institutions have become a challenge due to the inability of the government to merge openness into known rules, norms and cultural practices (Mungai, 2018; Francois van Schalkwyk, Willmers, & Schonwetter, 2016). A successful institutionalization of OGD will require the recognition and meanings actors attach to structure such as technological artifacts, organizations, individual actors, practices, and rules and their ability for these structures to constrain or enable OGD institutionalization (Mungai, 2018). Though this study attempted to understand and uncover socially created practices and behaviors that constrain or enable OGD institutionalization, the



discussion was focused institutionalization from the perspective of OGD publication and use. Therefore, this study did not attempt to uncover the underling factors but rather social factors that influenced OGD institutionalizing in Ghana.

2.20 Summary

Although there is considerable research on OGD, there is a paucity of an in-depth empirical understanding of OGD from the perspective of data publishers, data users, and citizens or beneficiaries of OGD initiatives. Few studies that have focused on theoretically identifying the social factors that enable and constrain the publication and use of OGD and the created public value. There is a paucity of research that has focused on identifying and bridging the gap of data ownership, network creation and alliances and culture. The literature review was therefore aimed at problematizing the existing body of knowledge with regards to the phenomenon under study and further make a claim for contextualising this study.

CHAPTER 3: THEORETICAL FOUNDATION

3.1 Introduction

The previous chapter presented the literature review on the phenomenon with the aim of providing a background understanding of OGD. This chapter presents the theoretical foundation for the study. The chapter discusses the initial theoretical framework used as a lens to aid in data collection and the Structuration Theory. Structuration Theory was used due to the emergent theme during the data collection and analysis phase. The chosen theory provided the lens to unearth and understand how socially constructed patterns and practices influence OGD publication and use in Ghana. How these patterns and practices change over time. Also, the theory will provide an understanding of institutional factors that influence the publication and use of OGD in Ghana. The use of Structuration Theory in this study was motivated by the need to understand socially and contextually constructed patterns and practices from different actors within a social system (Walsham & Han, 1991) and ways by which these concepts influence an IS phenomenon. The adoption of the Structuration Theory was the second stage of iteration or later stage of data collection, which represents the use of the fundamental principle of hermeneutics (Klein & Myers, 1999).

3.2 Theories in Research

Researchers use theories to provide explanations of a phenomenon (Whetten, 1989) within a set boundary of constructs and thereby avoiding irregularities. A theory is ‘a statement of relations among concepts within a set of boundary assumptions and constrains’ (Strauss & Corbin, 1998, p. 22). A theory can also be explained as a ‘set of well-developed categories (themes, concepts) that are systematically inter-related through statements of relationships to form a theoretical framework that explains a phenomenon’ (Bacharach, 1989, p. 498). The use of theory in research is dependent a phenomenon that needs to be investigated (Haugh, 2012). However, new explanations are sought for when existing theories are not able to provide adequate explanation to a particular phenomenon (ibid). Consequently, theories can provide explanatory, descriptive, and predictive meanings to a specific phenomenon (Gregor, 2006b; Whetten, 1989). The use of theories to investigate a phenomenon of interest is fundamental to research (Gregor, 2006).

3.3 Categorizing the Use of Theories in Research

3.3.1 Deductive Approach to Theories

Research that follows the deductive approach sets out by selecting a theory or conceptual model understand a particular phenomenon (Bara, Bucciarelli, & Lombardo, 2001; Pauwels, De Meyer, & Van Campenhout, 2013). Next the hypotheses are generated based on the constructs of the theory (Darke, Shanks, & Broadbent, 1998; Pauwels et al., 2013). These hypotheses are used to make predictions which are then tested empirically. A comparison of the prediction made by the researcher with the empirical data results helps the researcher to either a confirm or reject of the formulated hypotheses (Bara et al., 2001; Lee, 1991). Deductive research, which is often positivistic in nature generalizes its findings and conclusions to the larger population and is mostly quantitative in nature (Lee, 1991). Although the deductive approach of theory application in research is mainly associated with quantitative research (Chen & Hirschheim, 2004), deductive approach can also be applied in qualitative research (Bitektine, 2008; Hyde, 2000; Pauwels et al., 2013).

3.3.2 Inductive Approach to Theories

Researchers who adopt inductive reasoning begin their research with collected, observed, and analyzed data (Patokorpi & Ahvenainen, 2009). The researcher then identifies concepts and creates patterns within these concepts (Popper, 2005, 1959). The generated patterns and relationships are then used to formulate propositions and provide an inter-subjective understanding of the phenomenon (Popper, 1959). In addition, the use of an inductive approach to theories in research enables a researcher to understand and find contextual explanations to a phenomenon (Lempert, 2002; Popper, 2005). Although the inductive approach is critiqued on the impossibility of the exhaustive nature of empirical findings (Popper, 1959), it has been noted that researchers who align to the inductive approach of reasoning can start their research by using a theory or conceptual model to aid in data collection.

This approach enables researchers to formulate propositions that unearths the socio-contextual explanation and understanding of a phenomenon of interest (Kapitan, 1992; Patokorpi & Ahvenainen, 2009; Peirce, 1931). This is commonly evident in some interpretive research. For example, interpretive qualitative researchers such as (Bernardi, 2017; Rose & Hackney, 2002; Walsham & Han, 1991) started their study using different theories as a theoretical lens to aid in data collection. Afterwards the emerging themes led to either an extension of the theory or inclusion of other concepts that better explained the emerging theme. Bernardi (2017), for instance, set out to understand the role of IT in accounting within Health. For instance, in his

study Orlikowski (1992) used Structuration Theory as a lens used emerging themes to inform structurational views such as ‘system integration’, ‘time-space’ and ‘routinization’ in IS research. This affirms the need for open coding of emergent themes during the data analysis phase in interpretive inductive study usually includes coding of emergent themes (Zietsma & Lawrence, 2010).

This study initially started by employing and integrating concepts from the Legitimation Activity Model (LAM), Theory of Practice, and the Public Value framework to create a conceptual framework. However, due to the methodical and philosophical stance, the study required rich inter-subjective interpretation, explanation and understanding of the research context, interview participants, data and analysis pertaining to the phenomenon of interest. Thus based on hermeneutic fashion, Structuration Theory was selected as the primary lens. And for the purpose of additional categorization additional theories were selected after the first round of data analysis (see Table 3.2).

3.3.3 First Theoretical Lens for the Study

Combining theories in IS research has been recognised as beneficial. Gregor (2006), for instance, emphasised that the use of theories in IS research can be strengthened with the combination of different theories. Also, Wirtz, Weyerer, and Rösch (2017) noted that OGD research in developing countries needs more empirical-contextually based studies to address the phenomenon from the perspective of the supply and demand sides. Davies & Perini (2016) also revealed the need for theory building via cross-case learning for OGD.

3.3.4 The Legitimation Activity Model (LAM)

Activities in an organisation go through a process of legitimation. Legitimation entails formal and causal endorsement of organisational activities by individuals and groups based on personal and shared norms and values (Hussain, Taylor, & Flynn, 2004). Legitimation of Information Systems is regarded as necessary, and the inability to legitimate IS results in the failure of the adoption and use (Flynn & Hussain, 2004). LAM presents some activities that guides the legitimation process: (1) definition of the legitimation ‘*target*’ by the ‘*seeker*’ (2) identification of the legitimation ‘*provider*’ (3) acquisition of normative-based knowledge of the legitimation provided by the seeker to determine ways of communication with the provider (4) comparison of the norms of the legitimation seeker and provided by the seeker to determine ways of communication (5) identify ways to close up the difference between the seeker and the provider (6) obtained legitimation by the seeker from the provider (7) continuously observing



the actions of the seeker to ascertain impact. *Legitimation seekers* strive for endorsement/validation of an artifact-in this context OGD. This is achieved through the establishment of a *legitimation structure*. Consequently, the *legitimation provider* legitimates the artifact, through the known *legitimation structure*. What is acceptable or unacceptable in social practice is the legitimation structure.

3.3.5 The Public Value Framework

As used by Harrison et al. (2012), the public value framework indicates that the target of open government should be the creation of *public value* which should direct public sector goals. Public value should be the core of tenet of open government among others like transparency, collaboration, and participation between government and citizens. *Public value* can, therefore, be either ideological/intrinsic or substantive. *Public value* is achieved when governmental institutions take actions that serve the interest of their citizens and society at large. These *public values* vary among stakeholders or actors because of varying interests. The authors further noted that the issues of transparency and collaboration between government and citizen interaction are to enable the later to examine the activities of the former and participate in governance and decision making (Harrison & Sayogo, 2014). Open government success cannot only be defined by the quantification of displayed datasets on the data portals (Harrison et al., 2012) but by the public value created. Public value can thus, be either “substantive” or “ideological”. The substantive and ideological public value were discussed as tangible and intangible respectively. They have been summarized in the table below:

Table 3: Public Value Framework

	Impact	Explanation
Substantive	Economic	Financial inclusion and risks involved.
	Political	Using Open Data to influence stakeholders, groups on government activities, role in political issues, and public offices
	Social	Examines effects on relationship-family, communal, status identity and movement due to the use of Open Data.
	Strategic	The use of Open Data to influence benefits and innovative resources at the individual or group level
	Quality of life	The use of Open Data to influence overall well-being, such as, health, security, and satisfaction (group/individual).
Ideological	Stewardship/ power	Interpretation of performance of government (trust, integrity, equity) at the public level through the use of Open Data.
	Intrinsic/ extrinsic enhancements	Influence on beliefs systems, morality, and ethics in relation to government activities or strategies due to the use of Open Data.

3.3.6 Theory of Practice: Habitus and Capital

The theory of practice assumes the social construction of knowledge (Bourdieu, 1993). History, culture, and symbolic capital form habitus (Bourdieu & Wacquant, 1992; Seidl & Whittington, 2014). Habitus defines accepted social behaviours coopted in an actor's mind (Hanks, 2005). The proponent of the concept stipulates its objective and collective nature. Thus, habitus is not a result of dutifulness-‘regulated’ and ‘regular’ but also a ‘product of the organising action of a conductor’ respectively (Bourdieu, 1996; Houston, 2002). Consequently, habitus resides in an actors’ mind, and it occurs as a result of participating in practices and interaction between actors within a particular context (Bourdieu, 1993). Through socialisation, previous encounters and history are ways by which habitus can be formed (Houston, 2002; Jawitz, 2009) and incorporates actor’s tacit knowledge. The way actors comprehend their beliefs, values, and the world is built in habitus (Seidl & Whittington, 2014). As per plans incited by history, habitus delivers actor-based practices at both the aggregate and individual levels (Dumais, 2002; Wacquant, 1998). Therefore, the future is sustained based on the past being embodied in the present, through organised, existing practices (Bourdieu & Wacquant, 1992; McCall, 1994).

3.4 Conceptualizing the Proposed Model

The conceptual model initially proposed for driving the analysis in this research incorporates constructs from the LAM (legitimation *process*), Theory of Practice (*habitus and capital*), and



the Public Value Framework (*substantive or ideological*). In the conceptual framework, the supply and demand sides can be either legitimation seekers or providers and thus grant or monitor the process. Being a legitimation seeker or provider enables the supply and demand sides of OGD to formulate desired legitimation structures by constructing targets, learn norms, compare targets, plan tasks, and iteratively close the gap. The demand sides in the conceptual model are public administrators, bloggers, NGOs, data journalists, third parties, academic researchers, and citizens, while the supply side are government agencies that are mandated to publish data.

Data Publishers and Data Users are considered in the conceptual model respectively as providers and requesters of OGD. These are actors discussed as constituting the “supply” and “demand sides” of OGD (Ohemeng & Ofosu-Adarkwa, 2015). They are discussed in the model to have roles and views that may affect the process of legitimation. These roles can be either for ‘*discussion*’ or ‘*collaboration*’ with others—such as civil service administrators or amongst themselves (Ruijter, Grimmelikhuijsen, & Meijer, 2017b). The roles are further determined by how and what data is used. ‘*Public administrators*’ can play two roles, they can be either active or reactive data providers and at the same time engage in deliberate democracy through dialogue facilitation (Dawes et al., 2016a; E. Ruijter et al., 2017b; Yang & Zhiyong Lan, 2010). Although actors/stakeholders may have different roles within OGD, in some situations, such as Kenya’s OGD, they aligned these roles to foster the implementation of the initiative (Mungai & Van Belle, 2017).

The views of the supply and demand sides can either be ‘*monitoring (critical view)*’, ‘*engaging in public debates (deliberative)*’ or ‘*action (joined or participatory)*’ based on available and accessed data (Ruijter et al., 2017b). Thus the OGD platform is a facilitating instrument that enables the demand side to (1) monitor through availability and enabling data access, (2) encouraging “*collaboration*” and “*joined action*”, (3) permitting citizen-based communication “(*participatory*)” and (4) supporting “*deliberative*” action with several citizen-centered groups and journalists (Al-Sobhi, Weerakkody, & Mustafa Kamal, 2010; Ruijter et al., 2017b).

The social capital and habitus of the supply and demand sides will be examined to ascertain if they affect the process of legitimation of OGD. Social capital can be either economic or symbolic, while habitus involves an actor’s experience, culture, and history. Finally, after the adoption and use, the model may examine and understand the public value of OGD from the

perspective of the demand side. As Harrison et al., (2012) proposed, public value can either be “*ideological or substantive*.”

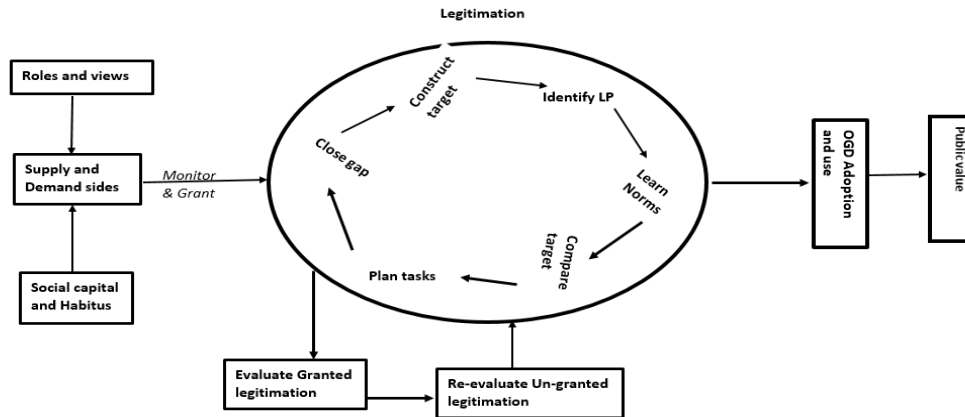


Figure 2: Conceptual Model for OGD legitimization in a developing country

3.5 Second theoretical Lens

Due to the merging themes and the meanings assigned to them by the interview participants, the main theoretical lens was changed to Giddens’ Structuration Theory. For further theoretical insight into the emerging themes additional theoretical lens were added for the purpose of categorization. To this effect Table 4 explains the processes followed that led to the selection of the Structuration Theory as the main theoretical lens for the study. Though the first theoretical lens was a combination of different theories, the Structuration Theory presented a better explanation to the empirical descriptions of the emerging themes. This may be the case because LAM was developed based on Giddens’ Structuration Theory (Flynn & Hussain, 2004; Hussain & Flynn, 2004). It has also been argued that Giddens’ Structuration Theory and Theory of Practice’s Habitus are both theories that contribute to social change that combines actions of individuals and structure (Morrison, 2005). In addition, Structuration Theory is seen to contribute to practice theory with the aim of explaining the actions of human/agency in a structure (Whittington, 2015). The Public Value Framework was maintained due to its ability to answer the third research question.



Table 4: Procedure for Selection of Second Theoretical Framework (adapted from Eisenhardt, 1989)

Number	Procedures	Action	Purpose	Application to Research
1	Initiate	- Define research questions. - Define constructs for the first round of data analysis.	- Research endeavor is centered (boundary conditions) - It gives ways of measuring established constructs.	Research propositions were initially formulated based on LAM, Public Value Framework, Theory of Practice as seen in section 3.5 as a lens for data collection. The data was then inductively analyzed based on emerging themes that aligned with Giddens' Structuration Theory. - What are the socially created patterns and behaviours that influence OGD publication and use in Ghana? - How do these socially created patterns and behaviours constrain and enable OGD publication and use in Ghana? - What are the public values created as a result of OGD publication and use in Ghana? New emerging themes from the data were developed and interpreted based on the Structuration Theory, and Public Value Framework.
2	Select case	They are theoretically informed and based on sampled population.	Provides flexible selection of case friendly theory and gives external legitimacy.	The initial theoretical lens for data collection was based on the conceptual model illustrated in fig. 3.1 However, Structuration Theory was chosen as data collection and analysis progressed. This is due to the emerging themes that could not be properly addressed with the initial conceptual model. These themes include power, data ownership, regulatory concerns, collaborative networks, data quality, control, power, and data sharing culture. These themes were further linked to data ownership, data quality, alliances or collaborative networks, and data sharing culture in the discussion chapter.



Number	Procedures	Action	Purpose	Application to Research
				- The Ghana open government data ecosystem is multi-actor environment that has both human and non-human actors interacting with each other in different and similar ways - The main data publishers and users in the OGD ecosystem are the demand and supply sides. And OGD is the technological actor or artifact.
3	Plan rules for data collection, including instruments to be used	- Use multiple methods for data gathering - Employ different methods.	- Provide empirical evidence to strengthen the chosen theory - View empirical evidence in a harmonious manner	To enhance internal validity, the study used reports, documents, semi-structured face-to-face, group, and online interviews to provide grounds for the propositions. NVivo was used to analyze data from different sources. This provided a synergic view of both primary (interview) and secondary (document) data.
4	Actual data collection	- It takes place concurrently with data analysis - Use flexible methods of data collection.	- Improvement of data collection (including instruments and questions) - Enables researchers to pay attention to the uniqueness of cases and emergent themes.	- A pilot study was conducted, which led to adjustments to the semi-structured interview guide. Subsequent adjustments were made as during the data collection. For instance, some of the interview participants wanted group interviews, and others did not want to be recorded. This enabled the researcher to understand the actors. - Interviews were conducted based on the availability of respondents. The interviews started with the data providers, which took the form of group interviews. The data providers then recommended data users they were aware of within the Ghana OGD ecosystem. - Data was immediately transcribed after the interviews and analyzed. This led to the uncovering of emergent themes which the researcher further investigated. These themes included power, which was mostly attached to data ownership, power of networks,



Number	Procedures	Action	Purpose	Application to Research
				communication, and multiple actor response to institutional pressures.
5	Data analysis	It happens within the analysis of cases	Use within the case as well as cross-case analysis	• Used Principles of doing interpretive (Klein & Myers, 1999b) research and thematic analysis. • The researcher developed and categorized themes based on LAM, Theory of Practice, and Public Value Framework. However, new emergent themes (as noted in step 4) prompted the use of Giddens' Structuration Theory. • Giddens Structuration Theory led to the development of patterns of interaction between structures, signification, domination, and legitimation. This was accompanied by in-depth analysis linked with the emergent themes. • The researcher then formed interactions between the emergent themes and Structuration Theory. • Cross-case analysis was used through the analysis of both data publishers and users.
6	Revisit propositions	• Provide empirical support for each construct • Reproduce rationale for the cases • Find empirical explanations to explain underlying relationships (answer the Why question)	• Provides a foundation for construct definition. • Helps in theory confirmation or re-adjustments that may lead to theory change or extension • It helps investigators build research validity internally	• Verification of the process of legitimation and influence of roles, views, social capital, and habitus by OGD publishers and users. And how these influence the publication and use of OGD and public value creation. • The initial theory was changed due to the frequency and importance of the emergent themes from both OGD publishers and users. Different patterns of interaction and propositions were then developed to help the researcher understand the OGD ecosystem in Ghana. The patterns included effects of structures of signification,



Number	Procedures	Action	Purpose	Application to Research
				domination, and legitimation on OGD publication, use, and public value creation. Codes were revised, and propositions were theoretically tested qualitatively to ensure internal validity.
7	Link back to literature	Provide explanations based on conflicting and similar literature	Strengthen theoretical construct definition and understanding and thereby build internal validity	- Findings from this study was discussed through comparison to literature. The discussion chapter focused on both empirical and theoretical elaborations. Propositions were formed to link the empirical elaborations to the theoretical elaboration. - Giddens' Structuration Theory was used to support and discuss the main propositions. The contribution is based on the use of Structuration Theory as the primary theoretical lens and other theories to provide explanation of the key findings.
8	Closure	Reach saturation based on theoretical explanations.	Reach closure as a result of saturation	Conclusion to the study was reached after the researcher realized that minor or no further improvements and refinements could be made given the empirical data.

3.6 Structuration Theory

Giddens' Structuration Theory was developed in the early 1980s as a social theory aimed at describing the nature social organization and human activity (Giddens, 1984; Jones & Karster, 2008; Walsham & Han, 1991). Structuration Theory started as a response to the debate among proponents of social theories about to human actions and social agents (Walsham & Han, 1991). Giddens' response to the debate was a reciprocal nature of the interaction between human agents and organizational or social action within a social process. This was referred to as the "duality of structures" (Giddens, 1979;1984). Structuration Theory highlights the *duality* of interaction between social practices and social actors. These social actors in established social processes.

This intertwined interaction between human actors and features of organizations is produced and reproduced over time. This interaction is established on what Giddens called *rules* and *resources* which are reproduced over time (Jones & Karsten, 2008; Jeremy Rose, 1998). Thus structure consists of rules and resources that can either facilitate or constrain social activity (Jarrahi, 2010). Therefore there is a recursive relationship between structure and actions, which leads to the term structuration (Giddens, 1979, 1984). Researchers generally use Structuration Theory to understand social occurrences and the reproduction of behaviours and practices across space and time (Jones & Karsten, 2008). Over time, the repetitive nature of these behaviors and practices become accepted as /part of the social system. Structuration Theory has been used by researchers as a response to the objective and subjective debate regarding the views of social reality (Dow, 1988; Willmott, 1981), because of the capacity of the theory to grasp both views.

In addition, Giddens proposed that social practices constitute *sanctions* and *communication*. Individuals within a social system communicate based on mutably understood schemes. These schemes produce meanings referred to as *interpretive schemes*, which is part of the *structure of signification* (rules via which meanings are generated). Social behavior causes sanctions to be evoked and social actors are usually aware of these because they form part a society's *legitimation structure*. Structuration Theory recognizes the structures of signification, legitimation and domination as the main structural dimensions of social systems (Fuchs, 2003).

The table below summarizes some of the constructs used in this study and its underlying assumptions as posited by Giddens' and other researchers.

Table 5: Some Constructs and the Explanation

Construct	Propositions
Agency	Agency is also referred to as human, social actors, individuals, or people. Giddens assumed and recognized the knowledgeable ability of actors within the social system. Agency also determines acceptable and unacceptable behavior within a structure plus accompanying rewards or sanctions.
Structure	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 (Giddens, 1984)
Social Systems	Giddens explained social systems as the continuousness of social actions over space and time. Thus social actions are “reproduced relations between actors or collectivities, organized as regular social practices” (Giddens, 1984, p. 25). Therefore, social systems are made up of social connections that are created and re-created over space and time by actions of people.
Structuration	How individuals within a social system <i>produce</i> and <i>reproduce meanings</i> .
Power, domination	Evident during an interaction between actors. It is linked to the use of both <i>allocative</i> and <i>authoritative</i> resources. The power within a social system is unequal. It is dependent on how actors mobilize or use allocative and authoritative resources.
Resources and rules	These are organizational resources used by actors during an interaction, with the aim of accomplishing a task and achieve results. There are <i>allocative</i> (individual’s capabilities over materials or objects) and <i>authoritative</i> (actors’ ability to control other actors within a social system) resources. Rules govern the behavior of people within a social system. Thus <i>rules</i> and resources <i>coexist</i> . They are embedded and exist within the actions of individuals. (Fuchs, 2003; Giddens, 1984a; Rose & Scheepers, 2001).
Modalities	How people use rules and resources during an interaction, this is done in a knowledgeable manner. Also, daily social interaction consists of meaning, power, and norms.
Communication	Individuals within a structure communicate based on commonly acceptable schemes. Individuals are conscious schemes as they are part of the structure of signification (rules based on which meanings are produced).

Construct	Propositions
Legitimation	Norms are part of the legitimation structure that allows for sanctions if not adhered to. Actors within the social system are aware of such norms and the sanctions.

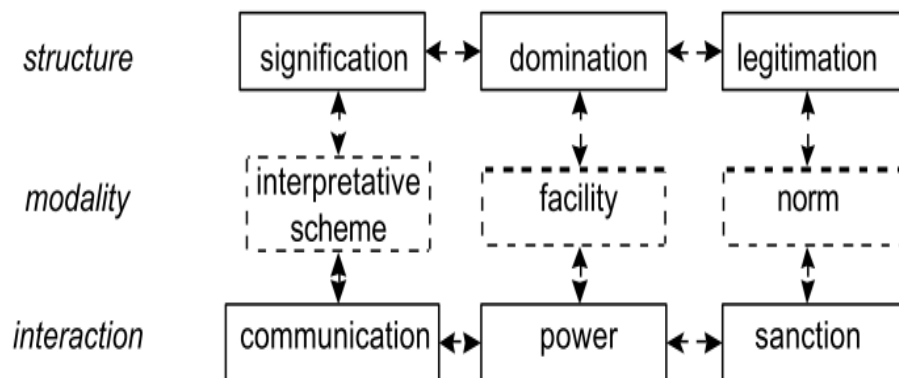


Figure 3: Giddens' Structuration Theory

According to Giddens, people use prevailing established knowledge during interaction and norms and resources which make up an organizations *structure of signification, domination and legitimation* (Giddens, 1984). Similarly, in IS, people interact within technology by using established knowledge, norms an resources that make up that structures of signification, legitimation and domination of an organization (Orlikowski & Robey, 1991b).

3.7 Structures

Giddens conceptualized structure to have both non-material or mental indications (Giddens, 1984). Including *rules* and *resources*. The existence of structure is based on how people use existing *rules* and *resources*. According to Giddens (1979, p. 121), “social structures are both constituted by h6uman agency, and yet at the same time, are the very medium of this constitution”. Thus “structures exist only in and through the activities of human agents” (Giddens, 1984, p. 256). So, structure is birthed out of the activities of social actors. (Giddens, 1984). Therefore, the existence of social activity is dependent on structure, yet structure in itself is neither a pattern nor a format. Structure comprises legislated *rules* and *resources* that mediate social activities via *modalities*-namely *interpretive schemes*, *facilities* and *norms* (Giddens, 1979, 1984). The manifestation of structures within social processes is evident in human interaction based on these *rules* and *resources* (Orlikowski, 1992). *Rules* regulate the behavior of human agents within a social system. There is required conformity from the actors;



consequently, conformity and non-conformity may result in rewards or sanctions (Giddens, 1984; Jones & Karsten, 2008). *Rules* provide a form of *legitimacy*, which Giddens referred to as *legitimation*; this leads to the reproduction of structures (Giddens, 1984).

Resources entail an actor's ability to complete tasks and an organization's tangible assets. Giddens explained that rules and resources are interdependent; that is, they are both critical within a social system. Resources were categorized into two, namely *allocative* and *authoritative* (Giddens, 1984). *Allocative* resources are obtained from the control of tangible assets and have the ability to demand adherence from human agents. *Authoritative* resources are consequent of systematization of actions of individuals (Giddens, 1984; Marshall, 2009); examples of such resources include expert knowledge, techniques, and technologies.

Giddens used *structure* to define properties within social systems, including *signification*, *domination*, and *legitimation*. To understand structures Ranson, Hinings, & Greenwood (1980), conceptualized its nature as shallow and a multifaceted medium of control. From this perspective, Ranson (et al., 1980) posited that an understanding of organizational structures is dependent on contextually grounded restrains, power dependencies, and the arena of meanings. Nevertheless, this notion of structures has been critiqued for the inadequate explanation of "how any reference to contextual constraints is relevant for analyzing how structures or media of control are actually constituted and constitutive" (Willmott, 1981, p. 470). From Giddens' perspective, the existence of structure is dependent on actions by people/actors. The people within these structures were expected to complete specific responsibilities; to this effect they devised ways of learning, understanding, and internalizing the rules associated with the duties as well as the resources (Jones & Karsten, 2008). However, a wave of familiarity sets in with time due to individuals' ability to learn, understand and internalize the rules (Jones & Karsten, 2008).

IS researchers have particularized the concept of structure to aid in understanding the organizational use of particular technologies (Chang, 2014; Orlikowski, 1992; Walsham & Han, 1991). The particularization was attained through the combination of technology and social structures to enable them to unearth the facilitating or restricting capacity of both concepts. In addition, Orlikowski (2000) presented a two-fold meaning of technology in terms of structures. These included technology as an artifact and technology in practice.

Orlikowski (1992, p. 410) further explained that human agents build into technology certain interpretive schemes (rules reflecting knowledge of the work being automated), certain



facilities (resources to accomplish that work), and certain norms (rules that define the organizationally sanctioned way of executing that work).

3.8 Agency

Agency is referred to as social actors, human beings, individuals, or people by different researchers (Jones & Karsten, 2008; Moore, 2011). Giddens recognized the inevitable role and importance of agency in the social system and the properties of structure. The core principle of agency, was based on *reflexivity* and *knowledgeability* of actors in the social system (Rose & Hackney, 2002). Giddens (1984, p. 5) posited that “all social, all human beings are highly ‘learned’ in respect of knowledge which they possess and apply, in the production and reproduction of day-to-day social encounters”. Actors’ ability to watch and routinely comprehend their activities is referred to as reflexivity. Reflexivity incorporates the constant checking of actors’ (plus others) actions, the social and physical settings (Giddens, 1984; Moore, 2011; Walsham & Han, 1991). Actors likewise possess *knowledge* that can be either or both tacit and explicit knowledge. Tacit knowledge is internalized individual knowledge; actors come to have this knowledge due to activities they engage in and may be difficult to articulate. For example, an actor may learn different and simple ways of accomplishing a task. Explicit knowledge is articulable knowledge and actors can openly communicate this kind of knowledge. An individual’s reflexivity and knowledge are often positioned like activities (Ranson et al., 1980; Willmott, 1981); the nature of activities are similarly situated within an actor’s ability or inability to express tacit knowledge in addition to both expected and unexpected outcomes of an activity.

Actors engage in regular activities that require the incorporation of knowledge and reflexivity; this leads to the establishment of patterns of interaction that become accepted organizational practices (Jones & Karsten, 2008; Moore, 2011). For example, employee evaluation, meeting coordination, and product manufacturing are regular corporate activities that became standardized (Orlikowski, 1992). These practices become entrenched over time forming organizational *structural properties* (Giddens, 1979; Rose & Hackney, 2002). The entrenched organizational *structural properties* are strengthened through and between actors. This is known as *duality of structures*, which Giddens categorized into subjective and objective *dualism*. Subjective *dualism encompasses* actors’ knowledgeable activities, while objective *dualism* pertains to organizational *structural features* (Giddens, 1984; Willmott, 1981). The actions of social actors within organizations settings, results in the formation of social



interactions that are produced and re-produced over time (Moore, 2011; Willmott, 1981). Social interactions produce and re-produce three essential features namely, *meaning*, *power* and (Giddens, 1984; Jones & Karsten, 2008). An analysis of these elements from the perspective of social actors can be discussed differently, although they were articulated by Giddens as inseparable and mutually dependent (ibid).

Meanings are created and established by social actors during an interaction. Human agents attain *meanings* by relying on stored knowledge that enables them to continuously communicate or interact with others; this is known as interpretive *scheme*. Giddens explained that “interpretive scheme forms the core of mutual knowledge whereby an accountable universe of meaning is sustained through and in processes of interaction” (Giddens, 1979, p. 83). Orlikowski (1992) however, stated that, *interpretive schemes* arbitrate *communication* as well as empower *shared meanings*. These *interpretive schemes* embody the *structures of signification* in organizations (Giddens, 1984). The *structures of signification* influence and define what organizational interaction is; and the rules that define the interaction from the institutionalized point of view (Jones & Karsten, 2008; Willmott, 1981). Interaction among social actors within an organization results in either altering or supporting interpretive scheme; this is due to the capacity and ability of social actors to either endorse or defy organizational rules.

Organizations provide capabilities that enable agency complete tasks and produce results. To finish the required tasks and subsequently produce results, humans within organizations interact, which causes *power* to emerge among social actors (MacKay & Tambeau, 2013; Rose, 1998). *Power* is evident among actors in their use of *resources* that belong to organizations to completing a task. Resources are categorized into two: *allocative*-which stretches over material occurrences and legitimate or *authoritative*-this stretches over people (Giddens, 1979; Giddens, 1984). *Power* is thus exercised via *resources*. Nevertheless, from the organizational properties point of view, *resources* enable the *establishment* of *structures of domination* in organizations. The *structure of domination* is evident in every *social system* and noticed via the unevenness of *allocative* and *authoritative resources* (Giddens, 1984; Rose, 1998). Giddens noted that through *dialectic control*, social actors may take actions that can result in the modification *structure of domination* (Giddens, 1984). The use of uneven resources by agents during interaction may lead to the endorsement of the *structure of domination* (ibid). A prevailing *structure of domination* can be reformed if changes also occur within the uneven resources. This change may be a steady or an obvious process.



In addition, actors are aware of rules in organizations that determine or *legitimate* proper behavior; this is known as *norms* (Giddens, 1984; Jones & Karster, 2008). *Normative sanctions* are applied in actors' interaction (Giddens, 1984; Willmott, 1981); these are articulated via organizations prevalent *cultural norms*. However, organizations regard *norms* to be made up of *structures of legitimation*. *Structures of legitimation* enable organizations to clarify and support its ethical mandate via tradition, practices of socialization, and rituals (ibid).

The structures of *signification*, *legitimation*, and *dominations* are essential in the theory of structuration and they are discussed in the following sub-sections.

3.9 Structures of Signification

The *Structure of signification* is characterized by rules within organizations, upon which organizational interactions are learned and defined (Giddens, 1984; Orlikowski, 1992). The signification structure is denoted by *interpretive schemes* (Orlikowski, 1992). Individual's, through social interaction change or strengthen *interpretive schemes* and endorse or test of rules of organizations (Rose & Jones, 2005; Orlikowski, 1992). As expatiated by Orlikowski (1992, p. 404) "...in any interaction shared knowledge is not merely part of the background, but is an integral part of the social encounter, in part organizing it, and in part being shaped by the interaction itself". Accordingly, *interpretive schemes* map out rules and interpretation of these rules involved in social action as well as the use of authoritative resources (Buhr, 2002); this is essential because communication between actors can either be inhibited or supported by them.

Kabanda (2011) explained that *interpretive schemes* were created symbolically based on social context by SMEs in the least developed countries. The author further explained that interpretive schemes enabled SMEs to mutually understand e-commerce. This implies the possibility of institutionalizing *interpretive schemes* in a social system through shared rules and facilitating communication between actors in a specific context (Kabanda, 2011; Rose & Hackney, 2002; Schultze & Orlikowski, 2004). Rose & Hackney (2002) exemplified *interpretive scheme* within the context of acquiring or requesting new computers by actors; the authors noted that actors were aware they needed new computers, but the responsibility of acquiring or requesting for one was the sole duty of individual actors.

3.10 Structures of Domination and Power

To Giddens, domination is socially constructed and reproduced over time and it occurs when people use either *allocative* or *authoritative* resources to exercise *power* (Giddens, 1984). Also power is socially constructed and dependent on the rationalization of control whereby different types of reliance give few *resources*, which provides superiors with control or power over subordinates (Giddens, 1984). Domination can be viewed from the perspective of power relations between actors and an actor's ability to exercise control over material entities (Pozzebon & Pinsonneault, 2005; Rose & Jones, 2005). Giddens considered power as an essential component of social theory and society. Giddens' perspective of power is based on actor's ability to use *resources* and achieve results (Giddens, 1984), which is evident in the action of actors (Jones & Karsten, 2008).

Power is an essential concept in IS research. For example, Kabanda & Brown (2015) explained how the mere presence of SMEs on a website was considered a form of power in a resource-constrained context. *Power* was used as a resource by the 'privileged' SMEs during interaction, although the use of the websites was limited to advertisement. Actors, therefore, draw on socially endorsed *power* as a resource and use it during interaction and in the use of technology in organizations (Barley, 1986; Orlikowski & Robey, 1991). Information systems are seen as a source of *power* by modern organizations, as IS delivers meanings for power to be implemented and legitimation for activities (Walsham, 2002). Social production and reproduction is dependent on resources which are the means through which power is implemented (Chang, 2014; Silva, 2007).

3.11 Structures of Legitimation

Structures of legitimation is included in Giddens categorization of *structure* (Hussain & Flynn, 2004) which is made of *rules* that define human social practices that are acceptable. The process of creating and recreating what becomes known as acceptable and unacceptable behavior by social actors is known as *legitimation*. From Giddens' perspective, individuals create the *structures of legitimation*; this spells out acceptable and unacceptable behaviors among actors and associated rewards and (Giddens, 1984; Jones & Karsten, 2008). *Norms* help actors recognize acceptable and unacceptable behaviors within specific contextual boundaries. Hence, actors' actions that deviates from the organizationally recognized norms often attracted sanctions (Yates, 1997).



Norms are enacted rules within organizations (Orlikowski & Robey, 1991b) that govern or determine human behavior that is suitable or legitimate. Giddens (1984, p. 30) explained that “normative components of interaction always center upon relations between the rights and obligations expected of those participating in a range of interaction contexts”. Also the concept of *power* among social actors in institutionalized organizations is relevant in the legitimization discourse (Hybels, 1995). Clegg (1989) explained that Weber established a link between legitimization and power, Weber’s classification of legitimization as consisting of charisma, authority and tradition and noted that these were socially constructed. Additionally, Clegg explained that Weber’s writing on power was founded on how formal authority led to legitimate power.

3.12 The Use of Structuration Theory in IS Research

Over the years, IS research has attempted to unravel the planned and unplanned outcomes of its implementation (Baskerville, 1999; Bostrom, Gupta, & Thomas, 2009; Greenhalgh & Stones, 2010; Pozzebon & Pinsonneault, 2005). Therefore, this has resulted in the use of different Meta-theories to make meanings of technology, society and subsequent outcomes (Bostrom et al., 2009). Giddens’ Structuration Theory is one of such meta-theories that has been used by IS other researchers (Bernardi, 2018; Bostrom et al., 2009; Jones & Karsten, 2008; Walsham & Han, 1991). Although the process of theorizing Structuration Theory by Giddens was not aimed at IS (Jeremy Rose & Scheepers, 2001), researchers in IS have used the Structuration Theory to help provide practical explanation and understanding of IS applications. Using Structuration Theory enabled IS researchers to understand the development of interaction between technology and users (Barley, 1986; Bernardi, 2018; Jones & Karsten, 2008) and the organizational repercussions of this interaction. IS scholars further use the theory to understand and explain the expected and unexpected results of the interaction between technology and users (Barley, 1986; Jones & Karster, 2008). In addition, in an attempt to find meanings and explanations to how worldwide contextual social practices and patterns evolve relative to IS, IS researchers have relied on Structuration Theory (Rose & Hackney, 2002; Rose, 1998; Walsham & Han, 1991).

Giddens’ Structuration Theory gained popularity in IS research due to the move towards constructivists and non-deterministic approaches (Hanseth, Aanestad, & Berg, 2004). This move was triggered by IS researchers’ attempt to provide additional social explanations to IS phenomenon (ibid). The non-deterministic move by IS researchers agree the need to look at



technology from a holistic perspective, which includes the technological artifact and non-technical components (human, social, context) (Orlikowski, 1992). Before the above, technology research was engrossed with the technical component, which included industrial machines and or equipment used for industry work (Jones & Karsten, 2008). However, critiques noted that these technologies used in organizations demanded a form of contextualization; that is, the use of a particular technology in an organization was dependent on the operations of the organization. This further led to the focus on the human dimension of technology as useful and quite recently a shift into non-deterministic view of technology, which recognizes the relevance of technology, organizational, environmental, and human contexts (Orlikowski, 1992).

The use of Structuration Theory in IS has enabled researchers to explain both planned and unintentional social-cultural outcomes of technology (Kabanda & Brown, 2017; Orlikowski, 1992; Walsham & Han, 1991). Research has identified how Structuration Theory helps understand and explained the outcome of technology before and after implementation (Orlikowski, 1992). For example, Jones & Karsten (2008) from a critical perspective revealed the three ways by which Structuration Theory has been used in IS research-namely IS use of Structuration Theory in a critical way; contextualization of Structuration Theory IS and applying the specific tenets of Structuration Theory in IS research.

3.13 Critique of Structuration Theory

Giddens' Structuration Theory has been critiqued on the following grounds:

- The conceptualization of *structure* as constituting *rules* and *resources*. Giddens posited that *structure* is set up in *action* and *exists* in the form of *memory traces* action. However, structuralists have argued in support of the tangible nature of structure in individuals' actions (Barley, 1986). This is followed by the critique of Giddens' view on *subjectivism*. Archer (1990;1996) noted that Structuration Theory deviates from the notion of structuralists' convention of structures, where structures have an undeniably increasingly unmistakable capacity in obliging to human activity. Also, Clegg (1989b) argued that the issue of *dualism* as posited by Giddens might not adequately explain individuals' knowledgeability within the perspective of contemporary peoples activities.
- Structuration Theory has also been critiqued on the fundamental issue of "*conflation*" of agency and structure (Rose & Scheepers, 2001). Researchers have problematized



“*Conflation*” as a reduction of *structure* to *agency* and resulting challenge of institutional documentation *apart* from *action* (Tolbert & Barley, 1997). An attempt to explain and understand the concept of *conflation* with regards to *agency* and *structure* in the integration of *system* and *social*, *from* Giddens point of view, may cause methodical challenges as clear distinction was not made by Giddens (Archer, 1990). Archer (1990) expounded on the need to analytically separate *agency* and *structure* because structures are permanent while actions of actors are not. Archer further suggested that the requirement to analytically differentiate between human actors and society, may led to an explanation of the present status of things.

- Moreover, the use of Structuration Theory in IS, has been critiqued on the grounds of providing explanation to change triggered historically (Archer, 1996; Stinchcombe, 1986). Archer (1996) suggested that the *reproduction* of *social structure* is not a critical issue. The author suggested that what is critical is grounded on finding reasons to explain the success and failure of some forms of structures. This will help to explain the reasons for success and failure associated with pre and post implementation of IS in organizations.

Although the above critiques have been leveled against Structuration Theory, Rose & Scheepers (2001, p. 222) posited that “Structuration Theory is a powerful vehicle for sensitizing understanding of the social. The author called for IS research that is focuses on understanding and providing social explanations to IS phenomenon via the interpretivist methodology. Barley (1986) similarly showed Structuration Theory capacity to in bridge the gap between determinist and subjective stance in IS research. Rose & Scheepers (2001) furthermore noted that the critiques of Structuration Theory were on internal ontological consistency. Nevertheless, Hekman (1990) explained that researchers who adopt Giddens’ Structuration Theory might encounter epistemological challenges.

3.14 Adaptive Structuration Theory (AST)

Adaptive Structuration Theory (AST) is one of the ways by which IS researchers contextualized Structuration Theory. Consequently, the theory centers on AST attempts to explain the relationship between social structures, the interaction between actors, and technology (Chin, Gopal, & Salisbury, 1997; Gerardine DeSanctis & Poole, 1994). AST supports the relevance of social actors in the technological environment (DeSanctis, 1989). These social actors determine the adoption, use and rejection of technological artifacts based on their desires (Desanctis & Poole, 1994). With inspiration from Structuration Theory, AST



also attempts to understand the concepts of *rules*, *resources* and *social structures* from a technological perspective plus actions of actors within an organization (Gerardine DeSanctis & Poole, 1994). Social structures are used as a guide by actors for task completion. With an inference from the Structuration Theory, it can be argued that structures existed before the influx of sophisticated technology. Such structures include standardized organizational procedures of operating, knowledge in an organization, pyramids of authority (Englund, Gerdin, & Burns, 2017; Fuchs, 2003). These *structures* can be fused into the design of technology, which may result in either replication with an aim of mimicking the non-technical aspects of an organization, or producing new technological *structures* through modification or combining manual practices (Gerardine DeSanctis & Poole, 1994).

AST also proposes technology presents a range of *social structures* that are essential for human interaction. For example, *structures* for voting may involve *rules* that guide voting and *resources* – namely electoral databases and screens that publicly display elections (openness) (Gerardine DeSanctis & Poole, 1994). Technology is considered as a type of organizational property (Orlikowski, 1992) that incorporates organizational *rules* and *resources* that form part of its structure. These structures become part of social life through their usage during interaction by actors. This creates what DeSanctis & Poole (1994, p. 125) referred to as “*structures in technology* and *structures in action*”. Both shape each other iteratively; are persistently interwoven; and evidence of an inevitable recursive connection between the *structures of action* and *structures of technology*. There is, conversely, a complex relationship between an action and technology. An understanding and knowledge of this relationship can lead to the understanding of how organizational change can be triggered by technology (Gerardine DeSanctis & Poole, 1994). This unearths the possible difference between the existence of *social structures* within *action* as well as *technology* (Orlikowski & Robey, 1991; Orlikowski, 1992).

A theoretical understanding of the IT artifact in IS research has been challenging (Benbasat & Zmud, 2003; Orlikowski & Iacono, 2001). Despite this challenge, AST has attempted to study advanced IT, specifically how IT is used and the impact generated (Grange & Benbasat, 2010). This perspective has revealed that the use of technology transcends beyond providing support for transaction and coordination but also as an artefact essential for social interaction (Grange & Benbasat, 2010). This has led to the establishment and application of *structural features* and *spirit* (Gerardine DeSanctis & Poole, 1994) in an attempt to provide a theoretical explanation to the IT artifact in IS research. The level of complexity of an IT artifact influences the



structural features (Grange & Benbasat, 2010). *Structural components* incorporate explicit *IT capabilities, rules, and resources*. For example, the *structural components* within an OGD web portal may include formats of a dataset (CSV, XML, JSON, XSL), data files that are primarily structured, interoperability, free, and easy access. These *structural components* control how users' access, use, interrogate and interpret available datasets. Thus *structural components* from this perspective provide meaning and regulations (Gerardine DeSanctis & Poole, 1994); which can be linked to Giddens' *signification* and *domination* respectively.

Spirit is the fundamental purpose and principles of the *structural features* (Desanctis & Poole, 1994). *Spirit* can be recognized by identifying the fundamental allegory of a systems *structural features* which include users' understanding of technical features, actions taken by users when using the technology, and explicitly addressing procedural gaps between designers and users (DeSanctis & Poole, 1994). The concept of *spirit* in IS appropriation research has been contextualized to signify an "anchor for the construct of faithfulness" (Chin et al., 1997, p. 345). *Spirit* may be also be defined from both *subject* and *objective* point of views (Chin et al., 1997). The *objective spirit* is external to the user – what is offered to the user, while *subjective spirit* is internal (as understood by the user) (ibid). Chin et al. (1997) agreed to the subjective notion of *spirit* and argued that *spirit* is both implicitly and explicitly constructed in the minds of social actors. It is through the notion of subjectivity that *spirit* can be experienced (ibid). The *spirit of technology* is linked to Giddens' *legitimation domination* and *signification* (DeSanctis & Poole, 1994; Giddens, 1984). Pertaining to *legitimation*, *spirit* provides a framework of norms that outlines technological acceptable and unacceptable behavior (DeSanctis, 1994; DeSanctis, 1989). The contribution of *spirit* to *domination* is evident in the unequal use of technology resulting from different levels of influence of the user. With regards to *signification*, *spirit* assists users to interpret and comprehend meanings associated with technology.

3.15 Additional Theoretical Concepts

Although the Structuration Theory was chosen as the leading theory for this research, contextual explanations from the empirical findings led to the inclusion of other views for additional categorization of the themes. These additions included Honoré's (1961) theoretical explanation of ownership and Castells'(2011) explanation of Network Power.

Castells (2011) posited the existence of our diverse types of power within social networks. Castells explained that at the core of society lies power relationships. These power relationships



are built based on actors' values and interest. Power relationships are exhibited through interactions between social actors in a network (Castells, 2011). The four types of power in networks can be understood from technological and social perspectives. The categorization of power includes

- a. "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"
- b. "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.
- c. "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".
- d. "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" (Castells, 2011, p. 774).

The study also applied Honoré's (1961) explanation of ownership to understanding of the themes from the empirical data. One of the critical issues in the era of openness pertains to who data or information belonged to (Hart, 2002). Honoré (1961) categorized the concept of data ownership from three perspectives namely,

- a. "The right to use whatever is owned"
- b. "The right to control the use of whatever is owned"
- c. "The right to remain in control of whatever is owned, without intrusion from others".

3.16 Summary

This chapter provided a discussion of the theoretical foundations underlying the study. It presented the conceptual framework used at the start of the study. The conceptual framework was made up of constructs from LAM, Theory of Practice, and the Public Value Framework. The Structuration Theory was later presented as the primary theoretical lens for the study due to the emerging themes and their explanations and the research questions. Also, Structuration Theory and Habitus have both been seen as having the capability to explain the actions of human and structure and the dual relationship between them. The Structuration Theory is



viewed as an essential force that enables researchers to understand and explain society and activities of individuals. LAM was part of the first conceptual framework was developed from Structuration Theory this may have contributed to Structuration Theory offering a better explanation to the emerging themes and the phenomenon of interest. The chapter also presented a discussion on the structures of signification, domination, and legitimation. The concepts of structures and agency were discussed. For the purpose of categorization and answering the research questions, additional theories were discussed.

CHAPTER 4: RESEARCH METHODOLOGY

4.1 Introduction

This chapter presents a discussion on the methodology for the study. As demonstrated in the preceding chapter, the study initially adopted and extended LAM to understand OGD adoption, use, and public value creation in a developing country. However, it turned out that the Structuration Theory was better able to answer and explain to the research questions. Also, the emergent themes in the study after the analysis of the interviews prompted the need to change the initially postulated main theoretical underpinning to ST during the empirical elaboration and discussion stage. Therefore, the purpose of this study changed from an investigating into how the process of legitimation affects OGD adoption, use and public value creation, to an investigation of how socially constructed behavioral patterns and behaviors of OGD publishers and users affect OGD publication, use and public value creation. To this effect, the researcher investigated these research questions:

1. What are the socially created patterns and behaviors that influence OGD publication and use in Ghana?
2. How does these socially created patterns and behaviors constrain and enable OGD publication and use in Ghana?
3. What is the public values created as a result of OGD publication and use in Ghana?

4.2 Research Paradigm

Research paradigms provide conceptual underpinnings that guide research. Paradigms as assumptions or a “basic belief system or a worldview that guides an investigation” process (Guba & Lincoln, 1994, p. 108) and thus affects the research questions and methods chosen for the study. A researcher’s worldview is known through the research paradigm that is used in a study. Research paradigms provide meaning and understanding of an investigated phenomenon. A researcher’s choice of research paradigm is linked to the particular phenomenon of interest. Research paradigms also guides the choice of a suitable methodology for the study (Myers, 1997). The most widely accepted and used research paradigms in IS include positivism, interpretivist, and critical research (Myers (1997). However, in general the most used paradigms in research are the positivist and interpretivist paradigms (Krauss, 2005; Lee, 1991; Mingers, 2001).

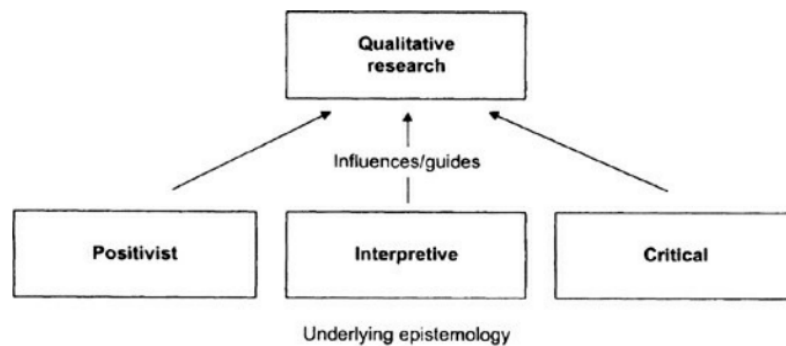


Figure 4: Underlying philosophical assumptions (Myers, 1997)

Several classifications have been used to distinguishing between these paradigms (Guba, 1990; Rayner, 2011; Schnelker, 2006). Epistemology, ontology, and methodology are common attributes of paradigms based on their classifications. These attributes constitute the fundamental differences between the paradigms as they present the different philosophical assumptions. As explained by Guba (1990) in Schnelker (2006, p. 44):

- What constitutes knowledge and the nature of knowledge is embodied in epistemological assumptions.
- Ontology responds to the issue of the form and nature of reality.
- To investigate a phenomenon of interest, researchers use different procedures and methodological assumptions.

Although these philosophical assumptions seem different, there is a high degree of interdependence between the ontological, epistemological, and methodological assumptions of a phenomenon under study. For example, a researcher's assertions on knowledge are the ontological assumption; how researchers come to know is epistemology, while the procedure the researcher adopts to acquire or understand the knowledge is the methodology (Guba & Lincoln, 1994; Schnelker, 2006). Using these philosophical assumptions by researchers unveils the differences and interrelationships that underlay a process of enquiry. Paradigms are defined by language and how things are defined as either right or wrong. These philosophical assumptions also aid in distinguishing between the different paradigms in research. For example, the dominate paradigms used by social scientist are the interpretive, critical and positivist paradigms (Orlikowski & Baroudi, 1991).

Table 6: Summarized Assumptions of Interpretivist, Positivist, and Critical Realist Research Paradigms

Paradigm	Description	Assumptions	Key References
Interpretivist	Interpretivist research attempts to unearth and understand phenomena under study based on the meaning assigned to them by people or the actors and the existing context. In IS research, the interpretivist paradigm helps research understand the interdependence between IS systems and the environment/context.	- Interpretivism accepts that social actors and context are the channels for accessing reality (subjectivity of reality). - It assumes that the meanings people assign to phenomena enables them to comprehend and interpret it. - The researcher and the phenomenon under study influence each other. - Interpretive research is associated with subjective knowledge creation. - It assumes the possibility of theory generation. - Findings can be generalized only to contexts with similar characteristics.	(Walsham, 2006) (Orlikowski & Baroudi, 1991) (Lee, 1991) (Klein & Myers, 1999b) (Goldkuhl, 2012)
Positivist	Positivists try to understand a research phenomenon through theory testing. Hence, positivist IS research considers a defined and definite framework, theory and hypothesis testing, and measurement of variables.	- Positivist research assumes objectivity, the independent relationship between the researcher and the phenomenon under study. - Also, positivist research assumes the objective nature of reality and its tendency to be measured by variables. - It is associated primarily with numeric data (quantitative). However, interpretive researchers also admit the possibility of a quantitative approach with interpretive philosophical backing. - It is linked with specific data, theory and hypothesis testing.	(Orlikowski & Baroudi, 1991) (Myers, 2009)

Paradigm	Description	Assumptions	Key References
		Positivist research assumes findings can generalize to a larger population.	
Critical Realists	Critical realists attempt to understand social phenomenon by focusing on the conflicts, contradictions, and appositions. This paradigm tries to unearth the underlying mechanisms that lead to social events. Researchers who adopt this paradigm make meaning of social phenomena through criticism, evaluation, analysis, and status quo modification.	- The nature of the object under study is used as a lens to understand it. - The objective existence of reality. - Assume the existence of stratified reality that is free of human cognizance and a sphere that incorporates the social construction of knowledge about what is real. - Reality is in three categories: observed, definite and absolute.	(Easton, 2010; Fairclough, 2009; Oates, 2005; Tsang, 2014)

4.3 Interpretive Paradigm

Knowledge in interpretive research is assumed to be subjective rather than objective, and hence reality can be known (Weber, 2004). To this effect, the meaning people ascribe to a phenomenon enables interpretive researchers to understand that particular phenomenon from a subjective perspective (Walsham, 2006). In relation to IS research, a researcher's adoption of interpretivism is aimed at producing an understanding in the context of the IS and the process whereby the IS influences and is influenced by the context (Walsham, 2006). Thus the choice of the interpretivist paradigm in IS research enables the researcher to acquire in-depth contextual knowledge of a system. Thus, if meanings are contextualized, it is important to get access to the contexts to understand the meanings attached to events. Although interpretivism has both ontological and epistemological explanations, Goldkuhl (2012), posited that the two are entwined in the interpretivist paradigm.

Interpretive research also assumes the multiple nature of reality. Two types of reality were identified by Walsham (1995): "inter-subject reality" constructed amongst researchers and respondents, and "subjective reality", created from individuals and groups. Meanings attached



to reality changes through time and space. The ontological stance of interpretivist research assumes that reality can be understood and is accessible within the human sphere (Walsham, 2006). Interpretivists seek to examine and understand how the multiple natures of reality ensue, change or endure across time and space (Walsham, 2006). The paradigm unearths how meaningful the social world is and can be understood subjectively from the actors (Goldkuhl, 2012). The application of interpretivism in IS research enables researchers to understand the meanings and interpretations attached to systems by the actors (Walsham, 1995).

Epistemologically, knowledge is purposefully created between researchers and respondents in interpretivist research (Weber, 2004). The application of interpretivism in IS research epistemologically is to derive in-depth understanding through the process of interpretation (Goldkuhl, 2012; Walsham, 2006). The paradigm highlights the inevitable change in the perception of investigators and respondents and their interaction (Myers, 1997). This leads to interpreting of the meanings actors share by the researcher (Orlikowski & Baroudi, 1991; Walsham, 2006). A researcher immerses herself in the social process to obtain an understanding of how it operates. Thus hypothesis, degrees of freedom and co-variances cannot be used to understand and explain social processes (Orlikowski & Baroudi, 1991).

4.4 Link between Structuration Theory and the Interpretive Paradigm

Structuration Theory is the leading theory used in this study to provide theoretical explanations to the phenomenon of interest. Structuration Theory works well within the interpretive paradigm in relation to both ontological and epistemological depositions (Bernardi, 2018; Walsham & Han, 1991). Using Structuration Theory, researchers can understand how actors create and re-create meanings during interaction and social action. Structuration Theory posits a shared communication between structure and agency.

4.5 Suitability of the Interpretive Paradigm for the Study

The applicability of a chosen paradigm is grounded in the researcher's ability to support her choice of that particular paradigm instead of the others (Guba & Lincoln, 1994). This study aims to understand the core social factors (practices and behavioral patterns) that influence OGD publication, use, and value creation. Walsham (1995) posited that the application of interpretivism in research helps the researcher to understand and contextualise the meanings attached to the phenomenon being studied. The phenomenon or IS artifact is OGD, and the context is a developing country. This study follows the fundamental principle of interpretivism as put forward by Goldkuhl (2012, p. 138) "*to work with these subjective meanings already*



there in the social world; that is to acknowledge their existence, to reconstruct them, to understand them, to avoid distorting them, to use them as building-blocks in theorizing". Klein and Myers (1999) acknowledged interpretivism in IS research can lead to either the management or development of IS, enables researchers to contextualise and comprehend the thoughts and actions of humans/actors. It also leads to the creation of in-depth knowledge and understanding of IS related phenomenon. Many early IS researchers noted that the suitable way to understand a social phenomenon is through the use of interpretive research approach (Butler, 1998; Butler & Fitzgerald, 1997;Walsham, 1995). The multiplicity approach to understanding social reality makes the interpretive paradigm appropriate for this research.

The purpose of this study was to unearth how socially created factors influence the publication, use and public value of OGD in a developing country. These social factors are essential elements of the OGD ecosystem created and recreated over time and passed on from generation to generation within the government ecosystem. Though the research did not initially set out to unearth these factors, the findings from the various sources of data uncovered these socially created and factors as behavioral patterns, practices, and perceptions.

4.6 Research Design and Method

A researcher's choice of method is driven by the paradigm chosen (Krauss, 2005). However, Walsham (1995) posited the non-synonymous nature of the interpretive paradigm and qualitative methodology. The commonly used research methodologies in IS research are the qualitative and quantitative (Myers, 1997). Research methodologies enable researchers to make specific assumptions of knowledge and the nature of reality, either implicitly or explicitly (Mingers, 2001). This study used the qualitative interpretive research method to understand the research phenomenon. The qualitative interpretative research approach enabled the researcher to provide a rich understanding and explanation of the empirical data. The use of qualitative interpretative method enabled the researcher to provide comprehensive explanations and understanding of actors and social action. Actors' interactions and their interpretation of behaviour, experiences, and actions are explained in an in-depth manner through the lens of qualitative interpretive methods (Klein & Myers,).

4.7 Research Scope

This study adopted qualitative analysis, using multiple data sources, a purposeful sampling approach, and semi-structured interviews. The managerial and organizational dimensions of IS research makes the use of qualitative approach essential (Galliers & Land, 1997). Using



qualitative data analysis enabled the researcher to categorize, scrutinize and interpret themes and patterns in empirical data. identifying themes and patterns in empirical data enabled the researcher to understand and answer the research questions.

Among the tools of qualitative analysis is the use of case study (Orlikowski & Robey, 1991a). The application of a case study in IS research is considered appropriate due to the change in ‘interest’ from concerns that are purely technological to ‘organizational’ ones (Benbasat, Goldstein, & Mead, 1987). Researchers who adopt a case study can examine present-day phenomenon, particularly when limits are not apparent amongst the phenomenon in a comprehensive way (Walsham, 1995). This study adopted a single case study. Single case studies enable researchers gather empirical data from respondents at different levels of an organization (Yin, 2013). The data collected for this study was from gathered from interview respondents at different levels in the selected organizations and secondary sources. This was achieved through group interviews and online search.

4.8 Case Selection and Data Collection

The method used for data collection is dependent on the research and interview questions (Schwartz & Olswang, 1996). The study adopted purposive sampling and snowballing. Purposive sampling was used because interview respondents were selected based on their adoption or use of OGD in Ghana. This selection process led to the use snowballing method of data collection to connect to respondents who were not known by the researcher. The use of snowballing and purposive sample is a common practice among interpretive researchers (Baxter & Jack, 2008; Yin, 2002).

At the start of the study, data were 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/organizations, technology enthusiasts). However, the initial sample was changed due to emerging themes. For instance, the researcher added other government institutions who were not “regarded as OGD publishers” as per the requirements. In addition, non-users of OGD were added to the sample population due to the issues raised by the initial sample on their use of OGD in Ghana. The sample population of OGD users was mostly based in Greater Accra and a few from the Ashanti and Central region. These three regions are considered as urban cities and well populated. The Greater Accra region, for instance, is the capital city and the seat of government; the region houses all the government institutions.



Before the collection of primary data which took the form of face to face and online interviews, the researcher had to ensure quality primary data was collected from the right respondents. Consequently, an online google search was conducted to understand the OGD ecosystem in Ghana and the key actors within the ecosystem. Search words such as open data in Ghana, Open Government Data in Ghana and Ghana Open Data initiative were used for the search. The search results were categorized into (actual datasets, bloggers, applications, online news reports, academic publications) and sub-categorized in excel with themes including the Uniform Resource Identifier (URL), year of publication, dataset where applicable, organization, description, actual use, and potential impact (see appendix). This search was beneficial in identifying the two main OGD publishers in Ghana and the users. The search also led to the discovery of an excel document that has been collated by the (Open Data for Impact) OD4Impact Map Africa Organizations appendix 8. This document contained the names of organizations in Ghana and other African countries that used OGD in addition to their location (region), sector, description, URL, city, state, founding year, size, advocacy, and products. In addition, the researcher was a country researcher for the African Open Data Barometer Report and the Africa Open Data Revolution Report both in 2018. The researcher was also part of the team selected to review the Ghana Draft Open Data Policy in October 2018. This further opened the researcher to documents and the right people to collect primary data from.

After identifying the respondent's permission was sought from the two main data publishers, this was necessary as they have been mandated by law to oversee the publication and possible use of OGD in Ghana. The interview guide and summary of the research were submitted for validation and comments before finally submitting for ethics approval from the UCT ethics board. Although approval was granted by both data publishers and UCT, a consent was still sought for from the interview participants appendix 2. The study later added other institutions who did not fall within the category of data publishers after emerging themes were analyzed from the data. The researcher also joined various social media platforms to following Ghanaian online news reports and the NGOs needed for the study.

The researcher collected online data including government and international funders and observer documents before the interviews. Additional data were also collected during the International Open Data Conference (IODC18) in 2018 in Argentina. During this conference, the researcher interacted with Ghanaian representatives who were also participants on OGD issues centered on OGD publication and use in Ghana. The researcher also had the opportunity

of interacting with other participants who were not Ghanaians but have been keenly monitoring OGD in Ghana.

Table 7: Data Sampling Table

Category	OGD Stakeholders	No. of Interviewees	Source of Data	Details of Documents	Symbolic Capital of Interview Participants
Data Publishers (DP)	Data Publisher 1 (OGD team)	8	Group interviews, observation, website, and Documents	National Action Plans, Survey reports, yearbooks, reports on the background of DP 1, 2	SDG Team, OGD Team (Head of communication, Chief statisticians, data analysts)
	Data Publisher 2 OGD Team	2	Group interview, observation, website, and documents		OGD Team (data analyst, quality control representative)
Public Sector Representatives (PS)	Public Sector 1 (Data personnel)	1	Individual interviews	Organizational Reports	IT personnel
	Public Sector 2 (Data personnel)	1			IT personnel
	Public Sector 3 (Data personnel)	1			IT personnel
Data Users (DU)	Data User 1	2	Group interviews, websites, and participant observation	Organizational, Country, continental and international reports, website publications	OGD Assessment team
	Data User 2	2			Data assessment Team,
	Data User 3	2	Group interviews, websites, and observation	None	Data Team, data journalists
	Data User 4	2			Data Team, data analyst
	Data User 5	3			Data Team, personnel
	Data User 6	3			Data Team
	Data User 7	3			Data Team, personnel
	Data User 8	3	Group interviews, observations, websites, documents		Data Team, data enthusiasts
Public	Beneficiaries	10	Interviews	Reports, training sessions	farmers, activists



4.9 Secondary Data Sources

Documents and online sources (like websites and social media) were used as additional sources of data in the study. The use of secondary data is supported by the interpretive tradition (Orlikowski & Baroudi, 1991; Walsham, 1995). OGD movement is in its early stages and considered critical for national development. Consequently, different organizations, several authors have attempted to understand the movement from different perspectives. Since the information contained in the documents was mostly text, the researcher coded by assigning meanings to the information (AlYahmady & Al Abri, 2013). Document analysis was used to analyses the documents (Prior, 2008). Document analysis is “the techniques use to categorize, investigate, interpret and identify the limitation of physical sources, most commonly written documents, whether in the private or public domain (personal papers, commercial records, or state archives, communication or legislation)” (Payne & Payne, 2004, p. 60). Though the purpose of documents is not directly tied to research, documents can be used as a source of information and provide an extra lens to help understand socially created realities (Payne & Payne, 2004).

The process of analyzing data from documents is also explained as “a systematic procedure for reviewing or evaluating documents-both printed and electronic material”(Bowen, 2009, p. 27). Documents used in this study were given to the researcher during the interview. The researcher also used search words like Open Data movement, Open government partnership, Impact of OGD, Status of Open Data in Ghana, Open Government Partnership Initiative Action Plans for Ghana, and Ghana Open Data Quality were used for the online searchers. Ghanaian online news portals were frequently monitored by the researcher for possible publications on government data-related stories. Facebook accounts of both DU and DP were also frequently monitored by the researcher. The documents were categorized as multi-national reports, country specific reports, websites, and social media.

4.10 Timespan

Depending on the phenomenon under study, a researcher may use a longitudinal or cross-sectional timespan for data collection (Gill, 2011). Researchers who use a longitudinal timespan collect primary data over a period of time (Jurison, 1996; Kaplan & Duchon, 1988). Findings from initial data are compared with new data during the data collection period by the researcher. Conversely, the cross-sectional timespan approach for data collection enables researchers to gather primary data once followed by analysis and production of the report (Van



Der Heijden, 2004). Although the data collection for this study lasted a year, the data collected during this period included follow-up questions and new interviews through previous participant's recommendations. It was also challenging access to some of the interview participants due to their job requirements. Thus, the researcher used the cross-sectional timespan approach for data collection.

4.11 Ethical Considerations

Ethical clearance was obtained from the faculty ethics committee of the University of Cape town. The researcher also obtained ethical clearance from the two main DPs and different DU in Ghana. The potential respondents reviewed the research questions and interview guide before agreeing to part-take in the interviews. This enabled the researcher to explain specific concepts to the potential interview respondents before the data collection. The interview participants were thus aware of the interview questions, this created challenges in some cases because the participants were unwilling to answer follow-up questions. Some also had predetermined answers and were not willing to provide additional information. The approval was granted by heads of the SGD and OGD committees for the DPs. On the side of DU, ethics was granted by data analysts and team coordinator. The researcher was given date and time for the interviews. Most of the interviews took the form group interviews. The interviews were mostly scheduled on group meeting days as it was challenging to have one-on-one interviews.

Some of the interview respondents did not want to be recoded, while others wanted verbal not signed consent. This was acceded to by the researcher. Confidentiality of the information and interview participants provided was addressed by identifying interview participants with pseudonyms (Example DP1, DP2, DU1, DU2). Some of the interview respondents also gave a verbal disclaimer before the interview. They stated that some of the views were their own and not a representation of the institution.

4.12 Summary

This section presented a discussion of the paradigms are IS research and why the interpretivist paradigm is considered most appropriate for the study. It also presented qualitative interpretive the as methodological perspective adopted for the study. The research design, method and scope were presented. The case selection and data collection, the data sampling criteria, sources of secondary data sources, time span and ethical considerations that guided the study.

CHAPTER 5: CONTEXTUAL BACKGROUND OF THE STUDY

5.1 Introduction

Klein & Myers' (1999) Principles for evaluating interpretive research were applied in this chapter. For example, the principle of contextualization enabled the researcher to understand and reflect on the socio-technical and historical context of the interview participants. (Klein & Myers, 1999). An understanding of the interview participants' background leads to an understanding of their experiences, exportations, and response to the interview questions. Also, how the backgrounds of the interview respondents influenced their perceptions and behaviour towards OGD and vice versa.

Ghana is located on the western belt of Africa with an estimated population of 28million with an elected president and parliamentarians (Effah & Nuhu, 2017). The country is associated with democracy as far back as 1992. Based on the democratic background of the country, it has an independent judiciary, electoral commission, and different public sector institutions. The public sector institutions oversee implementing government initiatives and fostering the relationship between government and citizens (Public Sector Reform Secretariate, 2016).



Figure 5: Ghana Map source – <http://www.ghanadistricts.com/Home/LinkData/7188>



5.2 Open Government Partnership Initiative (OGPI)

Ghana became a signatory to the ‘Open Government Partnership Initiative’ (OGPI) in September 2011. The goals of OGPI include promoting transparency, citizen participation, accountability, and using technology as an intermediary to deliver services related to government. These goals are translated into ‘Action Plans’, which are expected to be developed and implemented by the signatory countries (Alonso, 2012). The ‘Action Plan’ themes were transparency, legislation, citizen participation, accountability, technological and development. In addition, the themes had goals that had to be attained within a period. Each theme or goal had detailed actions, the specific dates and status of completion.

The timeframe for the ‘Action Plans’ was a two-year period. Thus, after signing to the OGPI, Ghana developed and implemented the first part of the ‘Action Plan’ from 2013 to 2014 and presented the report to the World Bank in March 2015 (Adamtey, 2014). Before submitting the report, the ‘Global Open Government (OGP) Secretariat’ independently assessed Ghana’s first ‘Action Plan’. After this, an additional assessment report conducted by Ghana was submitted to the ‘OGP Support Unit’. Based on the first ‘Action Plan’, the country was required to develop and implement policies and strategies that were in line with the goals of OGP (GODI Secretariat, 2014).

The tenets of democracy implemented and practiced in Ghana for more than twenty years are related to the goals of ‘Open Government Partnership’ (OGP) (Public Sector Reform Secretariat, 2016). Hence, Ghana’s signatory to the OGP, is a way of strengthening prevailing open government frameworks incorporated in the practice of democracy. Consequently, OGPI seeks to attain these goals through government commitments.

The completion of the first ‘Action Plan’ set into motion the development and implementation of the second ‘Action Plan’ from 2016 to 2017 (Public Sector Reform Secretariate, 2016a). The second ‘Action Plan’ was spearheaded with a workshop for stakeholders. The workshop was aimed at formulating suggestions for the second ‘Action Plan’ and reviewing the first ‘Action Plans’. The ‘Action Plan’ from 2016 to 2017 focused on attempt to pass the Right to Information Bill into Law, this was achieved in 2019 (GhanaWeb, 2019; Modern Ghana, 2019), Start Open Contracting by the Public Procurement Authority, encourage citizen participation through adult education and upgrade the Open Data Portal (Public Sector Reform



Secretariate, 2016a) The Lessons learnt, and issues recognized from the first ‘Action Plan’ informed the development and implementation of the second ‘Action Plan’.

The third ‘Action Plan’ was set in motion with an aim of expanding on the accomplishments and advancements as well as identifying and addressing the challenges encountered during the implementation of the first two action plans. Therefore, the focus of the third ‘Action Plan’ was to address gaps previously identified and display government’s commitment to attain the required goals OGD, from a multiple stakeholder review perspective. Based on the gaps identified some of the OGD goals were merged. The 2018 to 2020 ‘Action Plan’ was launched at the local assembly level to enable effective institutionalization (FoN Ghana, 2018). In 2021 despite the outbreak of the COVID-19 pandemic the 2020, the fourth Action Plan was developed for 2022 to 2023 and was validated in 2021 (Open Government Partnership, 2021). This was based on the lessons learnt from the third Action Plan. Regulatory Requirement

The openness initiative is backed by a ‘common law’, the Right to Information Act/ Bill (Whitmore, 2012). This law gives citizens equal access to data or information. Right to information also entails non-interruption by the government with regards to ‘freedom-of -speech” (Martinson, 1979). A “citizen has the right to information, for example, access to documents, and the right to be inspected based on the acceptable ‘common law’ ” (Martinson, 1979, p. 8). However, the notion of citizen has changed over time, citizens are now viewed as collaborators rather than mere recipients of interventions (Dalton, 2008). Mutuku and Mahihu (2014), posited that citizen participation in openness can be improved through increased awareness, institutional collaboration and response-driven feedback systems. Ohemeng and Ofosu-Adarkwa (2015), also noted the use of mobile platforms could enhance government /citizen collaboration in OGD in Ghana.

The tenets of OGD are associated with e-government and e-democracy (Chatfield & Reddick, 2018; Harrison et al., 2012). The legislative foundation for the concept of citizen participant can be traced as far back as 1992. Through the process of decentralization, the National Development Commission Act 1994, Act 479 was implemented to introduce citizen centered governance. The Act led to the implementation of a bottom-up approach in governance, which enabled citizens to participate and collaborate in governance.

The Right to Information Bill was passed and implemented into law in 2019 (GhanaWeb, 2019). The RTI is a fundamental law that guarantees citizens freedom of expression and



speech. The law also enables citizen's exercise political, civil, cultural, and socioeconomic rights. The RTI also gives citizens right to request and have access to data or information.

Data Protection Act, 2012 (Act 843) has also been passed and implemented in 2012 (Antwi-Boasiako, 2016). The Data Protection Commission is the institutional regulator of the Data Protection Act. The Data Protection Act is expected passed in 2012 was expected to protect the personal data and privacy of individuals. The law and the institutional regulator are expected to control how people's personal information is collected, stored, retrieved, and disseminated. In 2017, the regulatory institutions took legal actions against organizations that refused to comply with the stipulations in the law. The non-compliance was related to data collection organizations who had not registered with the commission.

5.3 OGPI Activities in Ghana

Recent developments of the OGD initiative in Ghana can be traced to several activities organized by international organizations, government, and different data users within the ecosystem. Some these activities are listed below.

One important activity was the organization of a collaborative educational workshop for both data publishers and users by the Africa Open Data and Internet Research Foundation (AODIRF). The workshop was organized in Accra, Ho, and Kumasi. The workshops 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 develop mobile and web applications through hackathons. In addition, the workshop discussed how to promote multiple collaboration between different institutions, identification of data needs, promoting data use and improving data quality (BusinessGhana, 2018).

Another data workshop was organized by the International Aid Transparency Initiative (ITAI) in Accra, Kumasi, and Ho. This event focused on using IATI data and creating awareness of available data and its use. A multiple stakeholder hackathon was also organized. The hackathon brought together different data scientists and data enthusiasts across Ghana. The participants explored and created new mobile and web based applications that were used to access and use data (International Aid Transparency Initiative, 2018).

A more recent OGP initiative in Ghana was hosting the Africa Geospatial Data and Internet Conference (AGDIC) in Accra. This meeting was the first of its kind in Africa. The conference focused on promoting the successful adoption and implementation of geospatial data in Africa.



The conference recognized the importance of collaboration between data producers or publishers and data users across the continent. Government was expected to spearhead the collaboration between different actors within the data ecosystem (Geospatial World, 2019).

In April 2019, a government-led collaborative workshop and hackathon was organized to revamp Ghana's OGD portal. The collaboration was between the National Information Technology Agency and Mobile Web Ghana. The workshop focused on a data upload challenge and a hackathon. Data from different Ministries, Departments and Agencies were made available for the data upload challenge and the hackathon (Donkor, 2019).

After the passage of the RTI law, government and civil societies/ advocates discussed ways to effectively implement the law. For example, the Right to Information Coalition and Media Foundation for West Africa (MFWA) organized a civic forum that discussed practical ways of implementing the RTI. This forum was attended by various stakeholders within the OGD ecosystem in Ghana (MFWA, 2019). For effective implementation, the government is set to form a Commission of RTI. The commission aimed to ensure that the implementation process was free from politics (Ghana Business News (GBN), 2019).

Although there have not been major OGD activities in Ghana after commissioning the RTI, some activities that were triggered by Ghana's participation in the OGD movement. For example, in October 2021 a data-led report published by the Ghana AIDS commission revealed that data available as of December 2021, 346,120 persons in Ghana were living with HIV. The report provided additional data on the breakdown of the infection rate by region with Ashanti region recording the highest. The data further revealed that women were the most infected in the Ghana (Citinews room, 2021b, 2021a). Social medial comments after the publication of this data were varying. Some noted that the compulsory testing of pregnant women is what has contributed to the increase in the number of women with HIV. Some of the comments included:

"The women are more because it's compulsory in certain situations, such as antenatal and other gynecological treatment" (Citinews room, 2021)

"Meaning men are having multiple partners hence the increase in women" (Citinews room, 2021b, 2021a)

"More women run the test compared to men. Statistics is like bikini; it shows you almost anything but gives you nothing" (Citinews room, 2021b, 2021a)



Also, based on the Open Government Partnership the parliament of Ghana in 2021 implemented Open Parliament and e-parliament to foster the interaction between parliamentarians and citizens aimed at endorsing transparency and openness (Parliament, 2021).

5.4 Data Publishers (DP)

The Ghana OGD ecosystem has two government-approved publishers. The two publishers are Ghana Statistical Service (GSS) and National Information Technology Agency (NITA). These two institutions have online portals that display government data from the various Ministries, Departments, and Agencies. Both institutions are mandated by law to ensure that government data is technically available.

5.4.1 Ghana Statistical Service (GSS)

GSS is regarded as the ‘Government Statistician’ (Ghana Statistical Service, 2021). Prior to Ghana signing the OGPI, the institution oversaw collecting, accumulating, and publishing national statistical data. This responsibility extended to coordinating and gathering statistical data from the various Ministries, Departments, and Agencies within the Ghana Public Service (Ghana Statistical Service, 2017). Thus, the various governmental Ministries, Departments and Agencies were also mandated to collect, process, and store citizens’ data. The data collected by the Ministries, Departments, and Agencies were mainly linked to their purpose. For example, the Ministry of Gender and Social Protection collects, processes, and stores citizen data on gender-related issues, social development, and children.

More recently, the responsibility of GSS was extended beyond just the collection and disseminating of statistical data. GSS is mandated to ensure that government data is open, accessible and user-friendly formats. GSS is also charged to develop, store, and publish government data and conduct assessment based on the indicators of the Sustainable Development Goals (SDGs). GSS is also responsible for reporting on how government data from the various Ministries, Departments and Agencies can be used to attain the SDGs. The agency is also in charge of determining the progress of the country in attaining the SDGs based on available data. GSS developed the National Reporting Platform (NRP). The NRP is expected to be linked to the website of GSS and provide a roadmap for SDG-centric data. Interview respondents (Data Users) affirmed the progress of GSS with regards to their assigned responsibilities.



“One major progress that is happening in the OGD ecosystem in Ghana, especially in the line of government data publication, is the leadership being provided by GSS. I mean, they have very current data and they provide what I regard as open data, which is beyond just statistical data. The guys there are doing a very good job. We must acknowledge that” [DU1].

5.4.2 National Information Technology Agency (NITA)

The National Information Technology Agency (NITA) was established in 2008 under the Ministry of Communication. NITA was tasked to electronically connect Ghana as part of the e-Ghana initiative. The agency was mandated to provide support and act as a backbone for e-government in Ghana. NITA was also charged with the implementation of government ICT policies. These ICT policies included identifying, developing, and promoting innovative technology, guidelines, standards and practices among Ghana’s various government agencies and institutions.

After Ghana became a signatory to the OGPI, the responsibilities of NITA were extended to include developing the open data web portal in 2011. The web portal was aimed at housing government data from the various Public Sector Institutions in Ghana (including all the Ministries, Departments and Agencies). The development of the open data web portal by NITA was part of achieving the Action Plans expected of countries that signed to the OGP. Therefore, NITA was expected to handle the innovative part of the OGD, 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.

5.4.3 Ghana’s Open Government Data Users (DU)

Ghana’s OGD ecosystems consist of multiple actors or stakeholders. Data Users (DU) are typically technology-based entrepreneurs who use data to create public value. DU for example, were made up of Non-Governmental Organizations (most of which are profit oriented), international observer and research groups, data enthusiasts, data scientists, technology enthusiasts, data journalists, bloggers, researchers, and academics. DU depends on published data by government institutions. Such published data was used and reused in different ways to create public value.

Most of the NGOs within the OGD ecosystem in Ghana were established before Ghana signed the OGPI. These NGOs specialized in developing technology-based products, entrepreneurship



grooming, and providing training on mobile applications. While some of these NGOs focused on providing general technology-based training and innovative solutions others critically monitor government activities through available data. Most of the NGOs focused on using technology to enhance and improve agricultural activities and the lives of subsistence farmers in Ghana.

These NGOs have capitalized on the OGD movement in different ways. They have become the key data users in Ghana. The NGOs create mobile-based technology solutions to educate citizens with the aid of data. The demand and use of government data by these NGOs are critical because they can create and trigger major impacts because the role of data publishers end once government data has been published.

“[...] I stand strongly by the involvement of other stakeholders in the ecosystem. Our responsibility is making sure data was available on the portal. The next phase will be successful if the other stakeholders use the published data in different ways to create something for the citizens” [DP1].

These NGOs are actively involved and collaborated with government and international organizations due to the OGD movement. For example, Mobile Web Ghana was actively involved with organizing the Ghana Open Data portal upload challenge and hackathon in 2019 and mapping for the Open Cities Accra Project (Sabblah, 2019). The Open Cities Accra Project is using OpenStreetMap, field data collection and remote mapping to make flood-prone areas in Accra resilient to flooding.

“[...] Mappers were tasked to map communities and build on already existing government data. The areas selected are areas of focus in a larger resilience project themed Greater Accra Resilience and Integrated Development (GARID)” [DU 3 affirmed by DU4].

Mobile Web Ghana has been involved in activities that leveraged available government data to create significant impact for citizens. Such activities include workshops on domestic violence, child labor, data management, and data publication training for government agencies and ministries.

Likewise, with collaboration, Esoko partnered with the government to collect, create a database, and publish data on about 10,000 farmers in 10 districts. This data was linked to a social interventionist programme called Livelihood Empowerment Against Poverty (LEAP) (Fuger, 2018). Esoko is a technology and profit-oriented organization that specializes in gathering and used available data to develop solutions for subsistence farmers. The organization has created technological tools that aid in the digitalization of data collection and



analysis. Through these tools, Esoko has been able to provide hands-on, customized technical solutions to farmers. The tools enable them to provide inadequate information on market prices and the complexities associated with the global food chain, changing climate conditions, bridge the gap between sellers and buyers and provide real-time agricultural extension services. These solutions are channeled to farmers via mobile technologies, namely call centers, voice messages, and SMS (Esoko, 2018; Vota, 2018).

Farmerline also started as a technology firm that develops data-driven solutions to aid farmers. Their focus on agriculture extends to developing data-driven solutions for government. This solution is focused on limiting the time used to collect and analyze agricultural data in Ghana (Farmerline, 2013, 2019).

Data enthusiasts and Data scientists are symbolic capitals inferred on actors within the OGD ecosystem. Actors with these symbolic capitals are interested in openness, government data, and effective and efficient use of available data. They also possess adequate knowledge, skills, and experiences on government data plus the concept of openness. Some of these actors have positioned themselves as bloggers; one of such bloggers is David Opoku of School of data (School of Data, 2015). Shahadu Sadik of the Global Open Initiative Foundation (GOIF) is also a well-noted technology enthusiast and an open advocate in the OGD ecosystem in Ghana (Sadik, 2019).

There are also data scientists and technology enthusiasts whose focus is on parliamentarians and parliament proceedings. They aim at bridging the gap between citizens and parliamentarians. And holding parliamentarians accountable through the use of available government data (Ekow et al., 2017; Odekro, 2016). Odikro is a non-governmental and non-profit organization that is focused on using parliamentary data to educate, empower and inform citizens about the activities of parliament.

The OGD movement also led to the addition of the symbolic capital of data journalist in the field of journalism. Data journalists focus on telling stories and creating impact via data use. Data journalists were regarded as the 'unsung heroes' of the African continent in a 2018 report of the status and emerging impact of Open Data in Africa (Van Belle, 2018). In Ghana, the concept of data journalism is still at the infancy stage. Yet, the country can boast of some data journalists who have won prestigious fellowship awards. The inception of OGD has created a gap in journalism in Ghana. This gap is currently being addressed through training and workshops. Also, there are NGOs in Ghana that specializes on training journalists with the



prerequisite skills of data journalism. Other international organizations have also volunteered in organizing various training sessions for journalists in Ghana. Because data journalism is an emerging area, these trainings and workshops focus on data visualization, data research, data processing and data analysis (Ansah, 2018). Despite the above, there are notable challenges of data journalism in Ghana. These challenges include access to OGD, laws that are specific to data journalism, data cleaning and visualization tools (Marfo, 2018). Thus, journalism has now gone beyond the simple story telling process to the inclusion of data. Journalism within the OGD movement is about telling richer-insightful stories, providing accurate and authoritative evidence (Hackett, 2013 as cited in Marfo, 2018).

5.4.4 High Level Reflection of the Data Users (DU)

The OGPI brought with its different symbolic capitals and new data-driven directions for individuals and organizations. Most of the organizations existed before the OGD movement. Their focus as an organization was to provide technology-driven solutions, educate and train citizens. This increased actors' knowledge, skill, and experiences in such organizations and their symbolic capitals. Although these individuals and organizations shifted their attention to government data, their focus did not change. For example, NGOs that focused on agriculture currently rely partly on available government for trend prediction.

Ghana's signatory to the OGD movement led to some collaborative interaction between specific Ministries, Departments and Agencies and the DU. This collaboration resulted in the use of technology driven solutions by the organizations to help government in collecting data at a faster and cheaper rate.

Due to their skills, experiences, and knowledge, these DU had different strategies for accessing and addressing data quality within the OGD ecosystem. For example, data communities and data teams were socially constructed to determine and discussing data quality beyond scientific methodologies. The DU within the OGD ecosystem were well equipped with technological infrastructure and skill because of their background in technology. The collaborations and networks created were because of social connectedness. DU used social to enable them access and use government data in ways that would benefit the citizenry.

5.5 Summary

This chapter provided a discussion of the contextual background of the study. The chapter provided a discussion of the general context of the study, which is OGPI based on the narrative



of Ghana. The background and current activities of DP and DU were explained. The aim of this chapter was to provide the contextual background for the analysis in the next chapter.

CHAPTER 6: ANALYSIS AND FINDINGS OF SOCIAL FACTORS THAT INFLUENCED OGD PUBLICATION, USE AND PUBLIC VALUE CREATION

6.1 Introduction

This chapter presents a qualitative analysis of data gathered from different sources, including data publishers (government institutions) and data users (international observers and researchers, journalists, NGOs, citizens) following interpretive principles. The chapter presents the practices and behaviors of multiple actors within the OGD ecosystem in Ghana and how these practices and behaviors affect the publication and use of OGD in Ghana. The chapter also discussed the institutional factors that affect OGD publication and use in Ghana. However, detailed discussion of the factors is presented in chapter seven.

To gain in-depth understanding of the effects of existing social practices and institutional factors that affect OGD publication and use, this study adopted a qualitative interpretive paradigm that enabled the researcher to collect data from multiple sources (Klein & Myers, 1999). For example, “the fundamental principle of the hermeneutic circle”, “the principle of contextualization” and “the principle of interaction between the researchers and the subjects” (Klein & Myers, 1999). The researcher attempted to understand generated themes by iterating between the views of the different respondents and the OGD ecosystem in Ghana. Both the historical and social backgrounds of the organizations of the interview participants were incorporated into generating the themes. This enabled the researcher to understand the contextual meanings attached to each team. Also, the different interpretations attached to the generated themes by the interview participants were considered to aid in the understanding of the themes and the empirical data.

The paradigm also led to the application of the induction approach for theorizing in the study. This led to the selection of thematic analysis (Braun & Clarke, 2006) and Klein & Myers' (1999) “principles for conducting and evaluation an interpretive field study”.

The research questions are

1. What are the socially created patterns and behaviors that influence OGD publication and use in Ghana?



2. How do these patterns and behaviors constrain and enable OGD publication and use in Ghana?
3. What is the impact/public values created as a result of OGD publication and use in Ghana?

6.2 Data Analysis Approach

Documents, online news reports, and transcribed interviews were uploaded on NVivo version 11. The researcher began data analysis by developing two different codebooks. The first codebook was designed using themes from the initial conceptual framework *figure 3.1* as a guide, but “open coding” and thematic analysis were used to identify emergent themes about the phenomenon of interest (Birks, Fernandez, Levina, & Nasirin, 2013; Sarker, Lau, & Sahay, 2000; Sarker & Sahay, 2003). The use of open codes and thematic analysis in this study enabled the researcher to create codes inductively through the identification of concepts deduced from data (Corbin & Strauss, 1990; Strauss & Corbin, 1998). The emergent themes led to the development of the second codebook, which is in line with the inductive approach (Barratt, Choi, & Li, 2011; Yildiz & Salem, 2013). The codes were then reorganized and categorized comprehensively based on recurrent themes (Bernardi, 2018; Lack, Noddings, & Hewlett, 2011) and finally based on the Structuration Theory. However, other codes emerged which were not in line with the Structuration Theory. These codes were therefore reclassified as organizational and environmental factors.

The emerging themes included power, data ownership, resources (technology, skill, communication, culture), network, and power in networks. Additional codes were comprehensively coded as organizational and environmental factors. This led to the development of “second-order” codes (Bernardi, 2018). The “second-order” codes were constructed in these thematic areas: structures of signification, domination, and legitimation as well as actors subjective and object meanings, resources, power, data ownership, and technology (OGD as a technological artifact plus other technologies used by actors in the OGD ecosystem).

The data were then analyzed based on the interpretive approach and thematic analysis. The use of both interpretive approach and thematic analysis helped the researcher understand the context and the information system (OGD) and how they influence each other (Braun & Clarke, 2006b; Klein & Myers, 1999b; Walsham, 1995). This led to the identification of existing complexity in the interaction between the context, IS and multiple actors. The interpreted data

were then used to provide a narrative of the social, behavioral patterns, practices, technology, and institutional factors that affect OGD publication and use in Ghana. Conversely, thematic analysis enabled the researcher to develop themes from the data.

6.3 Procedure for Theme Generation

Themes were generated with the aid of NVivo. To illustrate the process, hierarchical diagram below provides a pictographic view of which main themes were generated.

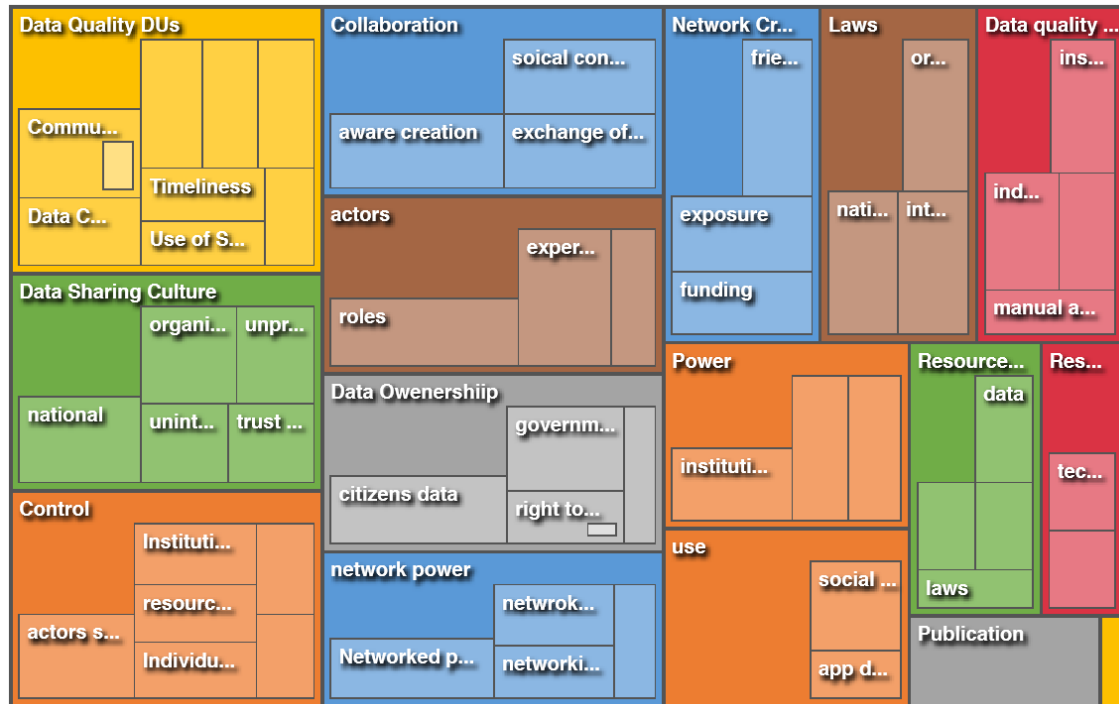


Figure 6: Code Output

6.4 Thematic Analysis

“Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 79). The use of thematic analysis in a study usually starts when transcribing data and ends with the completion of the study (Braun & Clarke, 2014; Braun, Clarke, Nikki Hayfield, & Terry, 2019; Clarke & Braun, 2018). The use of thematic analysis during data transcription leads to the familiarization of data by the researcher (Braun & Clarke, 2006b). This helped the researcher to understand, interpret and explain data. The use of thematic analysis provides a form of flexibility in the identification and explanation of themes in a study (Braun & Clarke, 2006; Corbin & Strauss, 1990; Yin, 2013). The application of thematic analysis in research can fall within both inductive and deductive approaches (Alhojailan & Ibrahim, 2012; Fereday & Muir-Cochrane, 2006; Frith & Gleeson, 2004; Pehlke,

Hennon, Radina, & Kuvalanka, 2009). Inductively, thematic analysis offers a researcher the privilege to develop themes based on available data. Its application deductively is dependent on the theory or conceptual framework used by the researcher. This study follows the inductive approach by identifying themes from available data and finding a theory that best explained the themes. The researcher, however, started the data collection with the aid of a conceptual model that was used as a theoretical lens. The process of applying thematic analysis in a study is categorized into six phases, which are explained in the table below. Though Braun & Clarke (2006) presented six phases of thematic analysis, the authors demonstrated the existence of similarities between the phases.

Table 8: Phases of Thematic Analysis (Braun & Clarke, 2006)

No.	Phase	Process Description (actions and application)
1	Data familiarization	<i>Read data thoroughly and generate initial codes</i> Recorded data were transcribed, written data/filed notes were typed into MS Word, and field notes were summarized. Transcribed data were named as Publisher1, 2; user 1, 2, 3... n. This led to the first stage of data analysis to enable the researcher to understand the data. The transcribed data was re-read alongside listening to the recording. Next, the researcher developed a codebook for the generated initial codes.
2	Initial code generation	<i>Systematic coding</i> NVivo was used to code transcribed data, documents, field notes, and online news reports. Manual coding was also used for field and observation notes. The coding was done based on paragraphs, sentences, and words within them. The online news reports were also coded as the reports were released. The coding was done, and themes were developed concerning the phenomenon of interest. The researcher compared each coded theme to the views of the interview participants. Each code was documented and compared to the titles. This process enabled the researcher to understand the data and attach meanings to the themes from the perspective of OGD publishers and users.
3	Search for themes	<i>Gather codes based on themes</i> Meanings were established based on the initial codes. A mind map developed at this stage led to the consideration of a possible shift from the first theoretical lens to a

No.	Phase	Process Description (actions and application)
		grand theory. This resulted in the attachment of meanings to the codes and identifying them as themes.
4	Theme reviewing	<i>Attachment of themes</i> The themes (main and sub-themes) identified were critically assessed to unearth similarities, differences, and themes that needed to be merged. At this stage, emerging themes were also coded and written in a second codebook. At this stage, the meanings and interpretations that emerged from the themes led to the shift from the original conceptual framework to the Structuration Theory. This phase promotes diversity and uniformity internally and externally, respectively.
5	Define and name themes	<i>Ensure consistency in the story and established themes.</i> Main and sub-themes were evaluated to ensure consistency. Define themes and provide the contextual explanations attached to each of them
6	Report production	<i>Start analysis with a reflection on research questions and existing literature.</i> The findings included a comparative analytical explanation of the themes from the perspective of OGD publishers and users. Then the researcher creates a narrative or story based on the identified themes as well as emergent themes.

6.5 Data Familiarization

Data familiarization required vigorous understanding of data from all the sources (example, transcribed data, documents, and online news reports), which resulted in the following activities.

The researcher listened to the voice recordings of the interview participants consistently before transcribing. The significance of data transcription during analysis is to enable the researcher to familiarize with data (Kvale, 2006). This was normally done immediately after the interview, which was essential because the researcher needed to recall relevant information and observations and compare it with observation notes and transcribed data. However, there were occasions when the researcher was not able to complete listening to the audio recordings and



transcribe data on the same day. This happened mostly with group interviews because it took longer time. Also, there were occasions where more than two interviews were carried out on the same day. But in order not to forget relevant observations and information, the researcher had to write them down.

Interviews were transcribed by writing them in MS word and then uploaded on NVivo. The word documents were named DP1, DP2, DU 1, 2... n, PS1, 2...n, and B1, 2...n. Thus, interviews were transcribed separately and independently of each other. However, responses from earlier interviews and follow-up questions led influenced subsequent interviews.

Transcribed interviews, observation notes, and documents were put in password-protected files. Transcribing the data incorporated ‘exclamation expressions’ such as “hmmm, oh, erm, ah”; these are essential as they provide relevant contextual information and meaning to primary data. The researcher observed that these ‘exclamation expressions’ in some contexts signified ‘pause and ponder’ while in other contexts, they meant “*I don’t want to tell you*”; “*I have forgotten*” or “*I don’t know*”.

Transcribing data typically took 3 to 4 hours per individual interview, but the group interviews with OGD publishers took almost 8 hours because those interviews took long hours to complete. Emerging themes were generated from interviews and field notes taken during the interview after the contents were enhanced. After each transcription, the researcher reassessed both the voice recording and the transcription to ensure precision and fill in gaps (Braun & Clarke, 2014; Clarke & Braun, 2018).

There was a time for ‘data reflection and deliberation’ by the researcher, this period was necessary because it enabled the researcher to critically examine and interpret the process as well as the data. An effective interpretation and examination of the data required input from the researcher’s supervisor. A meeting was scheduled to discuss the data, emerging themes, research questions, methodology and the theoretical lens. The discussion with my supervisor focused on data gathered from all the sources. Prior to the meeting, the researcher’s supervisor requested for at least two different ‘mind maps’ of the data. The ‘mind maps’ detailed the researcher’s reflections, interpretation, and understanding of the data.

Field notes are important in qualitative researcher (Seidel & Clark, 1984). In this study, field notes were essential in situations where interview participants did not want to be recorded. Such field notes were typed immediately after the interviews in MS word. This was important



as it could easily recollect observations and responses that were not captured in the field notes. The researcher again read the field notes critically for understanding and interpretation.

The researcher also read online news reports or stories related to the phenomenon of interest. This was required to establish meanings, patterns, and relationships between available data. Reports that focused on OGD publication, use, importance, and implications were initially coded. Reports that also focused on openness were also used and provided with initial codes. Data samples were downloaded from myjoyonline.com, graphiconline.com, peacefmonline.com, citifmonline.com, and ghanaweb.com. Data were collected covering the period from 2010 to February 2022, providing a time range is a known and acceptable practice in research that uses online news reports (Tian & Stewart, 2005).

Relevant data from the websites of OGD publishers, users and other public ministries were also analyzed. Data from this source was mostly in the written and not OGD datasets. However, OGD datasets were also monitored as per responses from interview participants to ensure consistency. Data from online sources were copied, pasted, and edited in MS word before uploading to NVivo. This data source also required reading and familiarization.

Documents were read critically read for understanding and to unearth patterns and consistency with data from other sources. Documents used in this study were mostly electronic. Analyzing documents enabled the researcher create empirical knowledge, understanding and meaning of data contained in them (Bowen, 2009; Strauss & Corbin, 1998). The document used in this study provided data on the context (Bowen, 2009b); additional data for the study (Goldstein & Reiboldt, 2004) and informed some of the questions and follow-up questions during the interviews (Hansen, 1995). Initial codes were created from the documents. Because there were many documents the researcher had to read carefully to identify consistencies and inconsistencies and merge codes were necessary.

The developed codes from the documents were also set aside. It is important to explain that the activities a researcher carries out during the analysis phase (transcribing and reading data, revising field or observation notes, listening to audio recordings) are iterative in nature. To ensure that the right data was analyzed the researcher reflected on the contexts in the study that is, Ghana's OGD ecosystem, the contexts of the interview participants, namely **Data Publishers** and **Data Users** as well as interactions and observations during the interviews. Details are fundamental in qualitative case studies (Darke et al., 1998; Yin, 2013). The table below provides a sample of transcribed data on the question on OGD providers and OGD

quality of OGD and the various responses from both OGD publishers and users. The identified broad concept here is **factors that influence OGD publication, use and created public value**. The table further highlights the overriding theme within the responses of the raw data.

Table 9: Overriding Theme from the Collected Data

Concept	Participant	Question/ Participants Response
		<i>Who are your primary and secondary data providers?</i> <i>How do you recognize or determine data quality?</i>
Factors that influence OGD Publication and use	DP1	<i>We are supposed to get data from all the public institutions and publish it on the web portal. This is, however challenged by issues with quality and who the data belongs to [...]. Ah, in a way, the data is theirs [...].</i> <i>We have a methodology that has worked for us over the years, so we use that. If your data does not meet the methodology, we won't publish it. By experience, we know those who meet the methodology and those who don't.</i>
	DU1	<i>It mostly comes from DP1 (pseudo); in the last few years, they have made major strides by providing access to government data.</i> <i>[...] the source of that data is very important. We can use the source to determine if the data are of quality by experience.</i> <i>We wanted to promote was a data road map eerr setting up a data community which brings publishers and users together [...]. These data communities are critical. They can change ahhh, how data is shared and used [...].</i>
	DU3	<i>This is very difficult to answer, we get our data from DP1 2 (pseudo), and erm also the story I want to tell or the app we want to develop.</i> <i>[...] You see OGD is not coordinated; it is scattered hmmm Hhmmm, we have a team of data experts [...] you see, they have the experience. What we do is we meet to discuss it [...].</i>
	DU11	<i>What we do is basically a search online for data, [...] but it is important to understand and know owns it, because government data is a big thing, and we don't want troubles [...]</i> <i>We have data teams that discuss the data we want to use; you know they have the experience with this kind of thing, and we also have software that we use [...]</i>
	PS3	<i>We collect our own data, using our own trained people hm [...] you see. We train them, provide technical support and pay them for the data. In a way the data is ours [...] you need to ask for it, if you need it [...]</i>

Concept	Participant	Question/ Participants Response
		<i>Our data is of high quality you understand [...]</i>

Table 10 was aimed at getting the views from respondents on the primary source of OGD and how OGD quality was identified. The responses from the respondents revealed the connection between the two separate questions, which the researcher did not envisage at the outset of the research. Thus, the source of data (data ownership) was seen as a determinant of quality. Data ownership thus played a crucial role in OGD in Ghana. There were also subjective views of recognizing data quality. As noted by DU1... 4, teams or discussion groups that were made up of ‘OGD experts’ were formed with the aim of discussing the contents of available government to determine its quality and hence reusability.

The responses from the interview participants revealed the different contextualized implications of the two questions. For example, while DPs were revealing the use of institutionalized methodologies, DU were illuminating the need to have teams constituting of people with experience in OGD. The findings also showed the existence of multiple actors with experiences due to the formation of teams and discussion groups. The above findings plus observations from the respondents may suggest a type of equality existing between data ownership and power.

The findings also unravel the challenges of data availability, interoperability, and integration mentioned in some of the documents used for the study. For example, a report by the Global Partnership for Sustainable Development (2018) indicated that “this analysis and stakeholder consultations [...] place a considerably increased demand on the NSS to provide a wide range of data, many of which are not readily available”.

6.6 Initial Code Generation

Conducting research implies the existence of a phenomenon of interest that requires an investigation. A phenomenon of interest under investigation can be a concept, an event, a belief, cultural practices or an action (Walsham, 1995; 2006). Data obtained by investigation a particular phenomenon of interest is read and labeled or coded (La Pelle, 2004). Codes are important in qualitative research (La Pelle, 2004; Seidel & Clark, 1984).

The meeting between the researcher and supervisor (as indicated in the previous stage) influenced the coding process and led to the revision of the initial code. It was agreed at the



meeting that the researcher should have three different levels of coding. First level or initial codes were strictly influenced by the theoretical lens while the second level coding was inductively influenced by emerging themes while the third level coding was influenced by a theory that best explained the emerging themes. Initial codes changed because of the significance of the emergent themes (as discussed with my supervisor). Hence, the revision of the initial codes led to the selection of the Structuration Theory, which best explained the emerging coded themes from the data.

The researcher applied both manual and electronic coding in the research (Basit, 2003). Manual codes were applied to field and observation notes (Basit, 2003). These codes represented themes, which were also recoded into codebooks. Emerging or important terms identified during the previous phase were regarded as automatic codes. A critical read and coding of the observation notes confirmed the significance of the emerging themes.

Braun & Clarke (2006) explained that coding helps in the categorization of data by researchers. Accordingly, the generation of codes was influenced by significant and interesting themes and events identified in the data from the different sources. The interesting themes or events generated from the data enabled the researcher to understand, explain and interpret the *socially constructed practices and patterns and their effects on OGD publication and use and the created public value*.

Due to the change in the theoretical lens of the study, new research questions were formulated using the Structuration Theory as a guide. These research questions thus influenced the coding process. The researcher prudently reflected on the research questions as well as transcribed data and field notes. A codebook was developed to prevent duplication. However, the interrelated nature of the concepts of the Structuration Theory made it difficult for the researcher to separate the codes. This led to another consultation with my supervisor. The meeting enabled the researcher to critically access overlapping by paying critical attention to each transcript and field note.

Reading and re-reading observation notes (which also contained follow-up questions) enabled the researcher find additional explanations to codes and research questions. Free coding was also applied to the follow-up questions during the interviews. The first interview question was targeted at identifying the primary source of government data by the interview participants triggered several follows-up questions on issues of ownership, accessibility, networks, and quality.

The use of thematic analysis in this study was iterative in nature. This implies that on various occasions, the researcher had to revisit the previous phases to make changes or for clarification. Because the study followed the induction tradition, ‘free coding’ was used in addition to previously identified codes. The researcher was able to generate 155 initial codes (see appendix 5).

As stated earlier, the codes were created from words, sentences, and paragraphs. The use of ‘free codes’ helped the researcher discovery new meanings. The free codes were mostly applied to observation notes. After the first level coding, the researcher reviewed the transcripts. This activity was essential because it enabled the researcher to match the codes with the responds of the interview participants and address inconsistencies.

With reference to the questions on data providers and quality, as identified in the previous phase. The table below displays the segmentation of codes based on the responses from the interview participants. The table shows that the actors’ identification of primary data providers and how data quality was identified was influenced by regulatory concerns, source of data, availability, online search, trust, communication, institutional requirements, and collaboration.

Table 10: Initial Codes

<i>Concept</i>	<i>Initial Code</i>	<i>Participant</i>	<i>Question/ Participants Response</i>
Factors that influence OGD publication and use			Who are your primary and secondary data providers? How do you recognize or determine data quality?
	Regulatory Concerns Control over data Institutional requirements	DP2	We are supposed to get data from all the public institutions and it publish on the web portal. This is, however, challenged by control and who the data belongs to [...]. You can’t force them. We have a workflow that the data passes through before it gets published. We have to ensure quality. [...] we know institutions whose data can be trusted
	Trust/ availability/ leadership/		I will say that mostly from DPI (pseudo), You can get both current and historical government data from them. For us here, we have the experience. Just by looking at it and the institution that uploads it is one
	Data source/ experience		



<i>Concept</i>	<i>Initial Code</i>	<i>Participant</i>	<i>Question/ Participants Response</i>
	Collaboration		<i>critical step. We use also use software.</i> <i>Another thing is this; we have a data team that has experienced members, we discuss it data before use.</i>
	Data source	<i>DU8</i>	<i>We just search online, but it must be linked with what we want to do as an organization. We use the website of DPI and international organizations.</i>
	Collaboration/ experience		<i>We are the data team, we have experience. We also use software.</i>
	Online search/ control/ownership Collaboration	<i>DU4</i>	<i>[...] but is important to understand and know owns it, because government data is a big thing, and we don't want troubles [...].</i> <i>We have data teams that discuss the data we want to use; they have experience with this kind of thing, and we also have software's that we use [...].</i>
	Control/ right to own/ institutional control/ resources	<i>PS 1</i>	<i>We collect our own data, using our own trained people hmm [...]. We train them, provide technical support, and pay them for the data. In a way, the data is ours [...] you must ask for it if you need it.</i>
	Institutional requirements		<i>[...] Our data is of high quality hmm; we have a methodology that we use and some technology though not enough. We have been doing this for a long time</i>



6.7 Search for Themes

In searching for themes the researcher applied the principle posited by (Klein & Myers, 1999). For example, the principle of multiple, suspicion, and interaction between the interview participants and researchers interpretation as posited by (Klein & Myers, 1999). The application of the principle of multiple interpretation was applied during when different interview participants were selected for the study. In searching for emerging themes in the study, the different explanations, understanding and interpretations of similar questions by interview participants and additional sources of data were used to provide multiple understanding to the themes. Searching for the themes also enabled the researcher to add her observations during the interaction with the interview participants and reviewing data from secondary sources. The principle of suspicion was also applied by using field notes and observations. Biases and alterations in the narratives of interview participants were also considered in this stage.

The identification of broad themes and patterns in thematic analysis is incorporated in this phase. The researcher carefully examined all the 155 generated initial codes in connection with the views of the interview respondents. Codes that were related but were identified by different names were merged.

The themes and sub-themes were initially manually identified and coded to establish relationships before transferring the codes to NVivo. They were coded as nodes and sub nodes to make the identified relationships explicit. The process of identifying and linking codes based on relationships led to the reduction of the code table.

Searching for themes led to a recreation of the codebook. The recreated codebook was influenced by emerging theme, the researchers, and interview respondents' interpretation of the initial codes. Simple words or phrases were used to identify the theme.

The researcher identified some codes that could not be categorized into themes; these codes were interpreted and grouped separately.

To provide an additional explanation on the questions on sources of data and data quality (as identified in phase1). An in-depth examination of the interview questions about sources of OGD and OGD quality led to the realization that the respondents were addressing the issue of factors that influence or affect OGD publication and use. The table illustration of the themes, description, identified sub-themes, and sample quotation from the raw data.

Table 11: Search Themes

Theme	Description	Sub-theme	Quotations from Data (identification)
Factors that influence OGD publication	Many factors influenced the publication of government data.	Source of OGD	<i>We are supposed to get data from all the public institutions and publish on the web portal. This is, however, challenged by control and who the data belongs to [...]. You can't force them (DP2)</i>
	In the context of Ghana, OGD indicated the existence of two main Data publishers.	Organizational Mandate	<i>We do the collection ourselves; this is very important because we understand and know what we want. We sometimes hire and train qualified data collectors to help us in the process. We think it's necessary for data users who want to use our data to follow the due process of getting it. Just come [...] and ask, and we will give it to you. Remember, we also must protect the data. (PS3)</i>
			<i>We have a law that works for us and, it has been there for a long time (DP1)</i>
		Human and technological factors	<i>We have a lot of data in the public sector, but the issue is they have inadequate technological and skilled persons to improve on it. The stored data is not easily shared (DP2).</i>
Factors that influence OGD use	Ghana's OGD ecosystem constitutes many data users. These users' approach, view, and use available government data from different perspectives and contexts, which	Social Attachments	<i>It is crucial to create friendships everywhere. It is important when you need data that is yet to be published [...] (DU2)</i>
			<i>There are times when I need data on something; I just make a call (DU2, 4)</i>
			<i>They need to tell stories that sell. So, you can't blame journalists. Data journalists are few in Ghana because it takes a lot to be a data journalist (DU 6).</i>
			<i>Ours is to produce and use parliamentary data to tell our stories and trigger change. (DU 7)</i>
		Knowledge	<i>You need people in your organization who understand government data. (DU3)</i>

Theme	Description	Sub-theme	Quotations from Data (identification)
	may influence OGD access and use.	Time	<i>There are times searching for government data becomes very difficult. You get it, and now you spend a lot of time to clean it and try to understand it. Some come with metadata others don't [...]</i> (DU2, 4)

Factors that influence the OGD publication unearths issues such as source of data, resources, and organizational mandate. For example, the ‘stories’ of the DP1 and 2 disclosed the existing dynamics between ‘who data belongs to and who control’; phrases like “**control and who the data belongs to**” were used. Conversely, data users narrated that the challenges associated with access to government data have led to the creation of social attachments. The concept of social attachments led to the use of friendship to get easy and quick access to government data. Other factors that influenced OGD use were knowledge and time. Time, for instance, was explained in relation to the search and cleaning data before use.

6.8 Theme Reviewing

Klein & Myers (1999) principles were applied in this section. For example, the principle of hermeneutic circle, contextualization, multiple interpretation and suspicion (Klein & Myers, 1999) were used in this stage of the analysis. To obtain an in-depth and logical understanding of the codes identified in the previous stage, the researcher used the principle of the hermeneutic circle to understand the point of view of the different interview participants. This was necessary because it helped the researcher the individual meanings attached to the identified themes and how those particular meanings help in the understanding of the research phenomenon. By applying the principle of contextualization, the researcher gained an understanding of the views of the interview participants by interpreting the data and understanding their background. The different interpretations used by the interview respondents in their response to the same questions enabled the researcher to combine all the views and identify emerging themes. The researcher also identified orderly biases that the interview participants during the interview. Such biases emanated from the prerequisite to protect data and have access to data.

This stage requires a rich understanding of the codes applied in the previous phase. This stage is critical as it requires a level of logical understanding to enable the researcher to categorize views of interview participants. In addition, it requires a reviewing of identified themes in



relation to an assessment of views of interview participants. This was done in two different ways. First the researcher interpreted the raw data in relation to the views of the participant captured in the field notes, documents, websites, observations and emerging themes. This ensures ‘credibility’ due to the researcher’s ability to report findings by engaging with different sources of data (Casey, 2014). These emerging themes were then discussed in relation the dominate theoretical explanations of the data which was the Structuration Theory.

To understand the main themes and their relevance, the researcher carefully evaluated each theme and other themes that were different from the main themes. To guarantee external heterogeneity, the researcher carefully reviewed the views of the interview participants and included knowledge of Structuration Theory. It is essential for a researcher to understand and identify both external and internal heterogeneity and homogeneity, respectively, in data analysis during the process of categorizing and reviewing themes (Braun & Clarke, 2006; Eisenhardt, 1989). Themes that are related are grouped (internal homogeneity) and those that are different are separated (external heterogeneity) (Miranda, Kim, & Summers, 2015; Tobin & Begley, 2004). These two concepts help a researcher understand and ensure uniformity between the views of interview respondents, the codes used for establishing themes and finally the sub-themes (Tobin & Begley, 2004).

To avoid losing the relevant information from the transcripts, it is essential for researchers at this stage to ‘recode’ parts of the interview respondents’ views that were not considered during the initial phases (Braun & Clarke, 2006; Braun et al., 2019). The researcher thus ‘recoded’ parts of paragraphs and sentences that were not included in the initial codes. The essence of ‘recoding’ is to ensure that the researcher paid considerable attention and correctly captured the views of all the interview participants. Consequently, the researcher conducted three rounds of coding and subsequently revisited phase 2, where initial codes were generated.

The researcher ensured that the main or super-themes and sub-themes accurately explained and expressed the views of interview respondents. This was attained by examining themes alongside sub-themes.

To illustrate this process, the table below provides a summary of over-extended themes on Data Ownership and Network Creation. As explained in the table below, data ownership was addressed by both data publishers and users as a subject that influenced OGD publication. The multi-stakeholder ‘stories’ of data ownership unearths the uncertainty surrounding the concept. The uncertainty can be understood in the narrative of the interview participant as a product of



unavailability of timely and quality data on some government-mandated web portals. Unavailability of timely and quality data was further profoundly rooted in the diversity of legitimization norms and principles among others. This called for critical multi-actor discussion which will focus on data ownership within the OGD ecosystem. OGD users also Created Networks as a way of getting access to government data that were unavailable, competitive edge, international exposure, and funding.

Table 12: Coding for Theme Reviewing

Reviewed Theme	Identified Theme	Description of Sub-themes	Sub-theme	Quotation from respondents on Sub-themes
Data Ownership	The publishers and users' perception of who owns OGD	Some explained that data on the government-mandated web portals belonged to 'government.'	Government Data	<i>The misconception is who does the data really belong to? This is a critical discussion that we need to have but has not been seen as important [DU 1].</i>
				<i>[...] You don't understand [...] we, as a government institution, also can be owners of the data because it is uploaded to the portal we develop and manage. But we include the sector we get our data. The issue of who the data belongs to is important in our case, but it is a bit complex [DP2].</i>
		Though the data was available on government web portals, the data is about the people; hence it belongs to them	Citizen Data	<i>Why should it be difficult for an ordinary Ghanaian to get access to data [DU4]</i>
				<i>It is like it is difficult for the very people whose data has been accumulated to get access to it [...] hmm [DU10].</i>
		Data sharing was considered as a challenge established on the issue of ownership.	Data sharing; integration and power challenges	<i>There is a problem with sharing data between us. And I think it is because the system is not integrated and this is affecting the new movement [PS1, 2].</i>
				<i>People feel they will lose when they share the data that they have. Data is like a source of power to them. And telling them to give it to use is like stripping them of that power [...] [DU 1].</i>
		Controversy surrounded the actual owner of government data.	Data ownership	<i>The perception is, we have become owners of the data when it is on our portal. Which is not entirely the case [DP2].</i>
				<i>[...] I don't get it, who actually owns the data [DU1, 2, 3].</i>

Reviewed Theme	Identified Theme	Description of Sub-themes	Sub-theme	Quotation from respondents on Sub-themes
				[...] Data belongs to the <i>citizens</i> [...] (Van Belle, 2018).
		Data users expressed their views on the need to understand data ownership.	Recognizing the sources of data	People should be told that the more they publish their data, the more others will <i>become aware</i> . And <i>the source will always be contacted</i> [DU1, 2]. We need to understand that when we share data, the <i>source will be cited</i> [D20].
Network Creation	Reasons why networks are considered important by OGD users	Data users created networks for different reasons and purposes.	International Funding	We <i>get international funds</i> , starting organizations like this need to open doors [DU 5].
			Donor support	Our <i>donor support</i> is evident [...], the <i>international organizations</i> mostly recommend and support these government initiatives also <i>help us</i> [DU 7]. We are <i>supported by different organizations</i> ; it is needed for exposure. So when you go to our website you will them [...] they are <i>mostly international</i> [DU 3].
	Social connections Communication			It is better to know <i>someone in the department</i> . It <i>makes it easy</i> [DU 1, 2]. <i>You must be connected</i> . your connections give you an <i>advantage</i> over <i>other organizations</i> within the ecosystem [DU3]. [...] there are some NGOs when they have an <i>agenda</i> , they don't think data. All they are interested in is doing something just to <i>create connections</i> . they produce lots of reports, but don't have data as the foundation [DP2]. <i>Knowing</i> the right <i>people</i> in this space is <i>necessary</i> [DU8].
	Networks as a source of Power			

6.9 Define and Name Themes

In this phase, the researcher conducted additional evaluated the views of the participants with reference to the previous phase. To ensure accuracy in the narrative, identified themes were individually evaluated in relation to the sub-themes.

Identified themes were contextually defined from the perspective of the interview participants and as captured in the data. The researcher paid close thoughtfulness to the narratives explained within the views from the interview participants and paraphrased where necessary. Supporting as well as rival explanations to the narratives of the respondents was assessed and incorporated in the write – up. With the themes, sub – themes and descriptions in mind, the researcher conducted another search to identify the theory that best explained the phenomenon of interest.

The principles of contextualization and multiple interpretation (Klein & Myers, 1999) were used at this stage of the analysis. It was important for the researcher understood the context and different perspectives and interpretations presented by the multiple data sources. This helped the researcher to understand the conflicting points of view and backgrounds of the empirical data.

Table 13: Explanation of Themes

Theme		Explanation
Data Ownership	Government Data	The publisher’s perception of OGD was explained as data owned by government. But present within this contextual explanation was data owned by institutions.
	Citizen data	Contrariwise, data users understood OGD as owned by citizens, who deserved access to their own data.
	Data sharing	Data sharing within this context was narrated from a negative perspective by DP. DU explained the existence of apathy with data sharing on the side of DP. However, critical analysis of DP and some PS revealed that the challenge of data sharing could be attributed to previously unintegrated systems and the somewhat autonomous nature of public institutions.
		Documented evidence of inter-organizational data sharing where a private organization shared pseudonymized citizens ‘mobile phone records



Theme		Explanation
		with a government organization (Dahmm, 2020).
		Documented evidence of sharing procurement data with citizens with the aim curbing corruption and championing transparency in procurement (Development Gateway Inc, 2017).
	Recognizing Primary Sources	Both DU and DP explained the importance of recognizing to the sources of data during use and publication. To DU, this acts as a form of protection.
	Private sector Data Generation	Some DU resorted to collecting their own data, which is not made publicly available.
	Organizational Mandate	An authority vested on Data Publishers by the government and per the OGPI.
		“For now, what we have is a scattered data being collected by different organizations” (a data enthusiast)
Control	Resources	Some of the participants elucidated that time and money invested in data gathering, processing, storage and disseminating data influenced the attitudes towards control.
	Institutional Data Control	Data was institutionally personalized; this unearthed the desire to control the data both within and outside the institution’s boundaries.
	Control Use	Institutional personalization of data also resulted in an attempt to control data use by potential and actual users.
	Continuous Control	Institutional personalization of government data further motivated in the desire to continuously monitor or control data use.
	Critical Concern	It influenced both OGD publication and its use.
		<i>“[...] Examples of security flaws; individual and institutional norms and standards of quality (e.g., Weak scientific rigor in analysis); legal confusion or gaps; or marginalized</i>

Theme		Explanation
Data Quality		<i>businesses and other incentives [...]</i> ” (Verhulst & Young, 2017, p. 35)
	Real-time	DU wanted frequent updates and ‘relevant’ data, which would lead to effective and efficient use.
	Communication	Data users used communication in two ways to ascertain quality of published data. First, used phone calls to confirm data quality and build data communities and data teams to discuss data quality based on specific principles.
		<i>“[...] When risks are not addressed at the initial stages of the value cycle (e.g., when dirty data is not cleaned at the collection stage) they accumulate and lead to additional risks downstream [...]</i> ” (Verhulst & Young, 2017, p. 35).
	Organizational Methodologies	Different organizational methodologies existed for data gathering, processing, storage and dissemination. There was computer aided methodologies and human centered workflows.
		Data quality challenges have been attributed to “weak scientific region” (Verhulst & Young, 2017)
Resources	Technological Infrastructure	Technology was an asset that provided a competitive edge for Both DU and DP. OGD also rests on technical openness to make data widely published and available.
	Human Resources	The skills of employees were seen as an essential organizational resource that influenced OGD publication and use.
Network Creation/alliance	International Exposure	Networks were intentionally and unintentionally created by DU. Networks was used as a competitive edge (i.e., evidence of internal exposure).
	Donor Support	Belonging to the right networks offered DU financial support and international accreditation. This influenced the kind of government data that was used.



Theme		Explanation
	Social Connections	Friendships were created to enable DP to have access to unavailable data.
Regulatory	International Requirement	As stipulated by the OGPI, signatories were required to develop and accomplish 2-year detailed action plans. And ensuring that data was legally open.
	National Laws	Some interview participants were aware of general national laws that supported the initiative.
	Organizational laws	Some of the participants were unaware of most organizational laws on government data. They also acknowledge possible conflicting nature of national and organizational laws that supports OGD.
	Implementation Strategy	Interview respondents suggested this as a requirement due to the conflicting nature of different rules and inadequate awareness.
Multi-stakeholder Perspective	Knowledge	Although actors within the viewed OGD from different perspectives, it was a subtle requirement to possess a certain level of knowledge of OGD. This knowledge was essential for survival.
	Skill	Actors possessed different skills. These skills enabled actors to collect, process, analyze, disseminate and use OGD effectively and efficiently.
	Experience	Actors acquired such experiences through consistent engagement with OGD and other actors within the ecosystem.
	Technological capability	This was essential because a characteristic of OGD is technical openness. This was acquired through training and experience.
Culture	Data sharing	Interview participants frequently associated data sharing with institutional culture. This culture was internalized because of unintegrated and independent systems.
	Social factors	

Theme		Explanation
	Organizational Norms	These were social behaviors normalized over time and established on organizationally acceptable and unacceptable behaviors.
Collaboration	Interconnectedness	The actors interact with each other. This interaction created a form of social networks that enabled them to use OGD.
	Innovation	Innovation using quality data
	Inter-organizational collaboration	There was evidence of collaboration that led to data sharing public and private organizations. This led to the development of policies that addressed citizens' access to social services and the extent to which communicable diseases spread (Dahmm, 2020).
Use	Knowledge	OGD use was influenced by knowledgeability of data quality, ecosystem, and innovativeness.
	Organizational goals	DU were influenced by the goals and missions of their respective organizations and professions. Example data journalists used data that enabled them to tell stories that could trigger social changes.
	User-friendliness	Usefulness of OGD was dependent on user-friendly nature of available data.

Individually identified themes were outlined alongside sub-themes and subsequent explanations. The explanations presented were centered on the sub-themes. For example, user-friendliness was explained with respect to the nature of published or available OGD. Identified themes and some sub-themes were then re-categorized in reference to the Structuration Theory as a process of theoretical particularization Table 3.4.

6.10 Report Production

This phase was discussed by unraveling and interpreting the empirical data. The themes generated from the empirical findings were used to describe the actions of different actors within the OGD ecosystem in Ghana and how their actions influence OGD publication, use, and public value creation. This sub-section thus used the principle of multiple interpretations (Klein & Myers, 1999a) to provide an explanation of the views of the interview participants.



This phase is presented in the section on empirical findings. The findings are discussed based on the emerging themes. Sub-themes are used to provide in-depth explanations and interpretations of the themes. Qualitative interpretive research assumes that meanings that are created by individuals were both subjective and intersubjective (Orlikowski & Robey, 1991; Walsham, 2006). Hence, “interpretive researchers thus attempt to understand the phenomenon through accessing the meaning that participants assign to them” (Orlikowski & Baroudi, 1991, p. 5). A report of the empirical findings is discussed in the next chapter.

6.11 Summary

This chapter specified the first stage of the analysis and findings of the social enablers and inhibitors of OGD publication and use in Ghana. The introduction presented the interpretive principles used for the chapter. Thematic analysis was used to identify the emergent themes from the empirical data. Data analysis was conducted with the aid of NVivo. The chapter also presents a breakdown of the five ways of categorizing interpretative thematic data analysis. Each of them was explained from the perspective of the empirical data. Sample quotes from the empirical data were added to each theme based on the stage in the thematic categorization. The aim of this chapter was to provide the foundation for a detailed report of the empirical findings in the next chapter.

CHAPTER 7: EMPIRICAL FINDINGS AND ANALYSIS – SOCIAL CONSTRAINTS AND ENABLERS OF OGD PUBLICATION AND USE AND IMPACT/PUBLIC VALUE

7.1 Introduction

To guide the researcher in the report production the principles of analyzing interpretive research was applied in this chapter. For example, the “principle of interaction between the researcher and the subjects, “the principle of multiple interpretation” and the principle of suspicion”(Klein & Myers, 1999). The analysis of the findings was presented based on the empirical data collected from the interaction between the researcher and the interview respondents, and secondary data. The researcher’s understanding of the OGD ecosystem in Ghana was improved, thereby changing her perceptions. These changes happened during the interaction, reading the secondary sources of data and events that the researcher observed and partook in. The researcher analyzed the data by developing themes. The views of the different interview participants, secondary data, and observations were used to understand and discuss each theme. Conflicting understanding and interpretation were also unearthed at this stage. For example, the case of conflicting reports in the presentation of the Covid’19 death data and the different perspectives of data ownership were unearthed through the principle of suspicion.

The researcher interviewed 33 participants in total. These participants were categorized into DP, PS, B, and DU. As part of the sources of data the researcher also included data-centered online news reports from different news portals in Ghana. DP were mandated by legislation to integrate and publish government data; PS were public sector institutions that were also mandated by legislation to collect and accumulate citizens’ data. DU were Non-Governmental Organizations (NGOs) that were profit-based organizations. The criteria for selecting NGOs were informed by their use of government data and their activities in the country. Their use of OGD may be either one time or several times. DU also included some data journalists and researchers who were not necessarily NGOs. The researcher also included online newspaper reports focused on issues of data in Ghana. Empirical data from the interview participants were analyzed with respect to the socially contracted behavioral patterns and practices that influence OGD publication, use, and public value. For the classification of interview respondents, number of interview participants and the sources of empirical data. category/number of interview respondents and sources of data.

7.2 Structure of Empirical Findings and Analysis

The analysis section is structured into three different empirical scenes based on the emerging themes from the empirical data. The first empirical scene presents a discussion on empirical findings from the perspective of data publication. The second presented data from the view of Data Use then the beneficiaries.

7.3 Empirical Scene 1

7.3.1 OGD Publication

The diagram below is a pictorial representation of the identified themes and the relationship between the themes with regards to socially constructed behavior patterns and practices that influenced the publication of OGD.

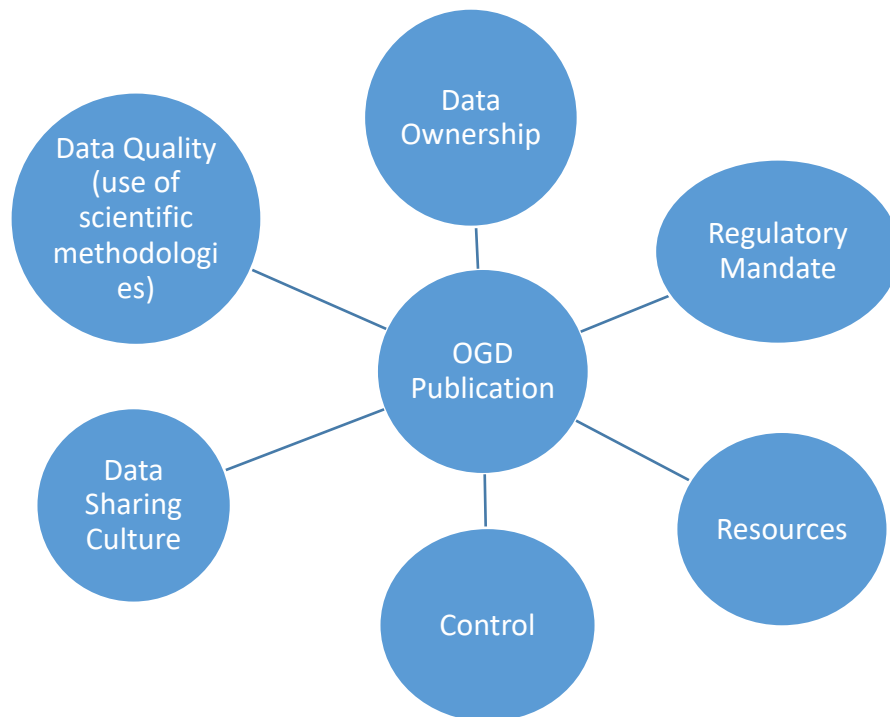


Figure 7: Emerging Themes: OGD Publication

7.3.2 Data Ownership

The empirical data showed contextual themes related specifically to data ownership, that is, “who owns data”. DPs and PSs were conscious of concerns surrounding Data Ownership. Data owners were contextually explained as the government institutions in charge of collecting, processing, and storing citizens’ data. Based in this, they were required to train, pay data collectors and provide them with the needed technical support. Some of the respondents argued that they set detailed standards (interviews, examinations, educational qualifications) to enable



them to ensure that the data collection, processing and storing was devoid of challenges. Thus, people who needed data had to consult the ‘proper organizational authorities’ and request for access. PS perceived that, institutional resources were used to accumulate and store citizens’ data. This gave institutions a sense of ownership over data that has been accumulated over time. Also, the existence and prolonged nature of unintegrated and manual processes in the public sector was explained as a contributing factor. Both DU and DP explained the importance of giving recognition to the sources of data during use and publication.

“We have been gathering, processing, and storing data from citizens for a long time It is what we do. So, we understand some of the concerns from our colleagues. When you have been doing something for a long time, it becomes part of you; you feel you own it and letting it go is like you are losing some part of you. On one hand we understand, but we also have to think about the SDG indicators and the unwavering role data plays in attaining them” [DP1– respondent 5].

To DU data ownership acts as a form of protection. Some respondents from the side of DP agreed with PS having a sense of ownership over ‘their’ data due to the resources, time, and money involved in OGD publishers and users identified public institutions and online portals as critical primary sources of data. However, they noted the existence of laws that require PS to give their data for uploading on the single portal on one hand and also a change organizational laws that gives them the ‘ownership’ rights. The respondents expressed their hope for change in their perceptions towards data ownership in the future.

“[...] you don’t understand; in a way they are right. They used their own resources to collect the data. Hhmm, there is a law that says they, must give us the data so we can upload. Remember also that there are organizational laws that protects them and their data”. So, we can’t force them. What we can do is to hope things about ownership the data changes. It is embedded in them; it has become acceptable” [DP2].

Some of the respondents expressed the need to address the challenge that perceptions of actors towards data ownership create with respect to data publication. They noted that actors’ perceptions towards data ownership, that is, seeing data from the perspective of single ownership might affect the OGD movement and the SDGs. It was also noted that the success of most data-driven project is based on a movement away from the perception of single ownership to deliberate inter/intra organizational collaboration.

“[...] if we fail to critically address this challenge, we might end up not realizing the full potential of joining the movement as country. As you know data is the core of attaining the SDGs. So, if we see data as something that has a single owner and therefore the need to protect and keep it hidden, we will go round in circles” [DP1].

“the was project successful because Vodafone Ghana furnished GSS and Flow minder with their customers’ mobile data records for use” (Dahmm, 2020).

7.3.3 Relevance of Data Sources in Data Ownership

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 DU had pre-determined mindsets on their sources of data, others could be categorized as “freelancers” who used government data from any source; to such DU, the most crucial aspect is the availability of the data. Explanations from interview participants

“I sometimes get is 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 DP1 and the websites of other government institutions. What you are looking for determines your source. Where the dataset is coming from is important” [DU6].

DU who depended mostly on DP1 for data due to the frequent updates. There was also evidence on the precise nature of data, and the different ways data was presented online. These determinates triggered the use of websites by DU. Also, the search for data by DU was dependent on the purpose of the organization, this was necessary because their purpose drove the data-driven activities they engaged in and the required data to perform those activities.

“We tell stories based on the data available. We mostly get data from (DP1). They have more current and up-to- date data on Ghana. We cannot use the data we get without knowing you collected it. By experience, it sometimes helps us to know if the data is of quality or not” [DU 7].

“We know where we get our data from; it is that simple. We trust they do a good job during all the stages of the life cycle” [DU 8]

“We search online for data, with our mission in mind and the apps we want to develop.” [...] [DU4].

Data source was also sometimes dependent on the story to tell or an impact to be created. However, the respondents noted that the mere acceptance that there were sources of data that



deserved to be acknowledged unearths the issue of data ownership and its implications on data publication and use.

“If I have a story in mind to tell, I first go online and search for data available on it and who owns it. Then, when I don’t get the data I want, I check the website of multi-national organizations.” [DU8 reaffirmed by3].

“The fact that we know where to get the data from means there is a sense of ownership. Someone or an institution used their resources to make sure the data was online. So, for me in a way, it is theirs. I mean where you get it from” [DU3]

7.3.4 Complexities of Data Ownership

The understanding and explanation attributed contextually to data ownership before OGD resulted in complexities with the inception of OGD movement. OGD required signatory governments to develop a web portal to publish government data. However, critical attention has not been given to data ownership. Consequently, there was empirical evidence of differing views on who owned data within the OGD ecosystem from the perspective of DP and DU. These arguments on data ownership were unearthed when the interview participants expressed the difficulties encountered in accessing current and historical data from some PSs for publication on the web portal. While some of the interview respondents believed that government data belonged to ‘government’, others believed it belonged to the citizens. For instance, in a report on the impact and status of Open Data in Africa, the authors maintained that “data belonged to the citizens” (Van Belle, 2018). 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 ultimately accessed at a cost, it was about the people, hence it belongs to them. As emphasized by some of the interview respondents:

“The misconception is, who does the data really belong to? This is a critical discussion that we need to have but has not been seen as important. If this is not addressed, accessing data for publication and subsequent usage will always be a challenge.” (DU 1 reaffirmed by 5)

“If they publish the data, we can use it and expose their incompetence and rot. So, the only thing to do is to protect it and lay down bureaucracies that are long enough to stop you from accessing it” [DU 7].

There were concerns about the difficulty data ownership creates when it comes to access to data by citizens. The concerns were directed at the vital role data played in the era of openness. Some of the respondents were of the notion that data was available, but access to it was challenging due to ownership issues and the quest to monopolize it to remain relevant continuously. The researcher observed that some respondents saw their relevance in the organizations to be tied to the data in their possession, thus publishing it was considered to have negative consequences. Data ownership to some of the DU was non-existent. To them it was just a concept being used to cover up fear of data sharing by some institutions.

“Why should it be difficult for an ordinary Ghanaian to get access to data? [...] I don’t get it, who really owns the data, when the data gets published. I know the data is available, so why can’t we get access to it. It looks like a monopoly to me due to its powerful nature.” (DU4-reaffirmed by DU 2).

“We believe the problem is more about data ownership as it is about fear. You know what, publishing data will enable us data users understand, interpret, and use data from different angles. This may lead to use uncovering things that may not be pleasant, so they are reluctant to publish it even when they have it” [DU1].

“It is like it is difficult for the very people whose data has been accumulated to get access to it. It is a struggle to get your mind around it. Do you know what we can do we data if this ownership issue is sorted? [...] hmm” [DU8].

“[...] is there anything like data ownership? Or it is just a perception or an idea held by people to cover the fear of sharing data?” [DU7].

The complexity associated with data ownership and its effects on data availability triggered a new wave of data sources that were different from the government publishers. As a result, OGD users ventured into collection, processing and storing of citizens’ data. But citizens’ data collected and stored by DU were not technically and legally open. This has caused a form of data “confiscation” by DU and DU due to the concept of data ownership. DU5, 7 explained:

“Because of the challenges with government data, we also collect our own data. But it is not really open [...] it is for the organization. I can tell you the number of times we have an idea to write a story or develop an app for to make life easy for Ghanaians but because we don’t get the right data to support, the initiatives just go down” [DU 5].

“There are some institutions that have a lot of data that can be used to help the ordinary Ghanaian. We can tell you there is data that can



help use predict trends, especially the extent to which communicable disease spread. However, the stress you will be subjected to before getting access to the data is too much” [DU 7].

The researcher observed a different development during the Covid’19 pandemics. Data was made available in real-time across various media platforms in the country. Data on the number of infections, deaths and recovery were available on the websites of public sectors and the websites of news agencies. However, the news agencies referred to the particular ministry the data came from. There were no discussions of who owned the data, the focus of the ministries and news agencies was to create as much awareness as possible. Thus, though there are complexities associated with data ownership, there may be events that demand the publication and use of current data without paying much attention to ownership. Such events can place demands on the DP to make data available thereby curbing the issues surrounding data ownership.

7.3.5 Perceived Solution to the Complexities of Data Ownership

The complexities associated with data ownership was discussed with respect to misconceptions and confusion surrounding who owned data. The respondents noted the need to address these complexities for the successful institutionalization of OGD. The respondents mentioned different strategies that can be adopted and implemented to curb and respond to the confusion surrounding data ownership. It was argued that the success of OGD institutionalization in Gahan will depend on effective sensitization among all the actors. To this effect, some DU and DP expressed their views on the use of education and communication in the form of discussions and dialogues to address the subject of data ownership due to its effects on data availability and use. Institution wide training, communicating shared meaning, and education were seen as important step towards access the complexities surrounding data ownership. It was suggested that these steps should involve all staff members and not selected staff. Such initiatives may influence and thereby change perceptions on data ownership. The education should focus on addressing the issue of ownership, the importance of making data available per the OGD directive, and the role of each institution and actor. As explained by respondents

“People must be educated that when you give your data out [...], it does not necessarily mean you have lost ownership. It even gives your institution a sense of recognition and exposure. The very inherent idea that the release of data meant the transfer of ownership should be addressed at different levels in organizations.” [DU1]

“Let the education trickle down to all staff, so that they will be acquainted with what the act says” (Graphic.com, 2021).

“What has not been discussed in this open data movement is how to train the people and help them move from paper-based data capture, recording and storage. We need the sensitization, to change the whole perspective of who owns what and who does not [...]” [DP2]

“We believe the only way to make it a win-win situation is through effective communication. We must communicate, engage in dialogues that address the challenge of data ownership and hope to gradually change our perception on ownership. It is the era of openness and we must take a full advantage of it” [DP9].

DU recognized the value of understanding data ownership within the OGD ecosystem. Data was understood as a powerful tool of which owners or publishers should be recognized. Understanding data ownership from the point of view of DU enabled them 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 the activities of actors/institutions at every of the data life cycle was an essential step addressing the issue of ownership and encouraging data to be made electronically available. As explained by interview participants

“[...] assuming if I want data on hospitals. I go to the government portal on hospitals to get the data I need. I use it for what I want, but it is important for me to acknowledge the data source” [DU3]

“We as an organization cannot just get up and start developing apps and telling stories with other people’s data and not give them the recognition they deserve, especially if the data belongs to the government. Our story on child labor, achieved groundbreaking records because we got it from the right ministry [DU 4].

“We understand the consequences of using someone’s data and not acknowledging it. So why should ownership even be a problem” [DU1].

“I don’t understand; this is not something to argue about. We all know where we get our data from and we acknowledge. It is a must” [DU5].

“odekro’s work on the effectiveness of MPs’ in parliament is at the same time courageous and groundbreaking. Given how parliament has reacted in the past to such feedback, it requires a lot of courage for a small CSO to tread that path. Groundbreaking because Odekro



relied exclusively on data provided by parliament. You can dispute the conclusion but not the data” (Desert Bloom Advisory, 2019).

Table 14: Data Ownership Coding References by Node

Data Ownership Coding Referencing	
Node	Number of coding references
actors\\DPs 1	21
actors\\DPs 2	11
actors\\PS1	8
actors\\PS2	7
actors\\PS3	10
actors\\DU1	11
actors\\DU2	9
actors\\DU3	6
actors\\DU4	5
actors\\DU5	4
actors\\DU6	7
actors\\DU7	6
actors\\DU8	9
citizens data	15
government data	20
organizational data	11
right to control use	16
right to control use\\right to remain in control	18
data as a property\\right to own\\individual	17
data as a resource\\right to own and control	28
data as a property to own\\organizational	19

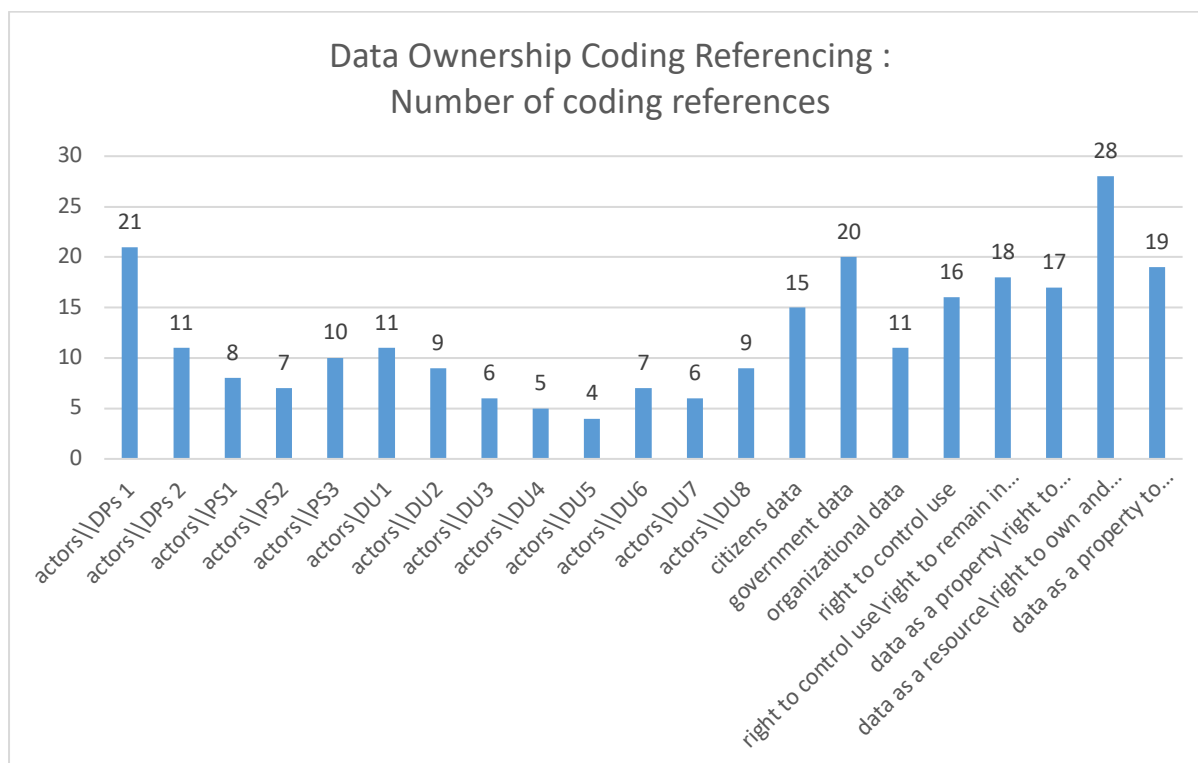


Figure 8: Data Ownership References

7.3.6 Data Sharing Culture: unwillingness to share

Data sharing within this context was narrated from a negative perspective by both OGD publishers and users. Data sharing was considered a challenge due to the perceptions surrounding data ownership. It was perceived that the behaviour of actors towards data sharing was the outcome of their perceptions towards data ownership. DU explained the existence of apathy with data sharing on the side of DP. However, an analysis of DP and some PS revealed that the challenge of data sharing could be attributed to previously unintegrated systems and the semi-autonomous nature of public institutions. Interview participants frequently associated data sharing with institutional culture. This “silo-culture” was internalized because of unintegrated and independent systems. The institutionalized bureaucratic structures as well as the tendency for some

“There is a problem with sharing data between us. I think it is because the system is not integrated, and this is affecting the new movement. It is difficult moving from one system to another without adequate training and education” [PS1].



“If we want to ensure that data is shared amongst us, it has to be done on equal bases. I can’t share my data with you and when I need it from you, I get exposed to several bureaucracies. It has to be done nationwide” [PS2].

“The problem with this country is that people are averse to releasing information, especially public officials” (Alhassan, 2020).

These became social behaviors which were normalized over time and established as organizationally acceptable or unacceptable behaviors. Data sharing was not shared in a proactive manner and this is due to underlying culture of PSs and DPs. That is the known norm and culture of data sharing was either not existent or users had to ask for data before it was made available. The challenge of data sharing was identified to be deeply rooted in institutional factors such as organizational culture. This has caused data to be scattered throughout PSs and not integrated. The unintegrated nature of data should allow data intermediaries to synthesize the available data. However, the ability to synthesize unintegrated data by intermediaries was dependent on data sharing.

“Once you start to proactively share data in a way that can be re-usable and accessible it changes the whole dynamics. Institutional factors like culture can be a major factor the affects data sharing and publishing also” [DU 1].

“Sharing institutional data has always been our challenge. I always say that it is deeply rooted in institutional culture. I think with regards to changing this culture and outlook; there is a long way to go in terms of the front liners hmm [...]” [DU2].

“For now, what we have is scattered data being collected by different organizations. To address this challenge, we have to revamp the open data portal and to bring uniformity to the sector to improve public service, government efficiency, economic development, transparency and accountability and must be made accessible and readable for re-use” (Data enthusiast) (BusinessGhana, 2018).

7.3.7 Different Perspective of Data Sharing: Inter-organizational Collaboration

Although data sharing culture has been one of the hindrances to OGD publication in Ghana, there is evidence of data sharing between the public and private sectors. Evidence of such inter-organization activities related to data sharing happened in 2018 between a government institution and two private sector organizations. In 2018 GSS, Ghana Telecommunication Company (Vodafone Ghana), and Flowminder (a Swedish non-profit organization) agreed to work together by sharing the mobile phone data of citizens. Vodafone Ghana was expected to



provide GSS with Customer Data Records (CDR) (Dahmm, 2020). The data was expected to be aggregated and analyzed by Flowminder.

The purpose of the collaborative sharing of citizens' mobile phone data was used to aid in planning and developing sustainable public health policies. Though data sharing was the core of the partnership, specific measures were taken to protect citizens' data by addressing major data concerns (Dahmm, 2020). The measures include

1. Data provided by Vodafone Ghana will be pseudonymized. Example citizen's demographic data was not included in the sharing.
2. The shared data was used strictly for the project and for generating national statistics for SDG indicators.
3. The organizations involved were expected to either delete or return confidential data upon completion of the project.
4. The output of the project was expected to be published under open-source license with the aim of addressing ownership and intellectual property challenges.
5. Guidelines on access and processing of customer Data Records were enumerated.

“Vodafone Ghana shares pseudonymized versions of data to Flowminder, who then aggregate the data before GSS can have access. This was to make data access at the sub- district level and not from individual devices” (Dahmm, 2020, p. 5).

Though the above project is an encouraging example of data sharing between public and private organizations, such collaboration is rarely seen and documented among public sectors. The researcher observed that the public sectors had in their possession both historical and current data, which if published will enable them to develop public policies that will benefit citizens. Public sector organization rather engage in individual institutional training and sensitization on data sharing.

“During a sensitization workshop on the need to share data/information to citizens, public institutions were admonished to share. The workshop was organized for employees of the Land Commission in Ghana” (Graphic.com, 2021).

“The Ministry of Information has asked managers of state institutions not to hesitate in releasing relevant data/information to the public in accordance with the Right to Information Act [...]” (Graphic.com, 2021).



The individual, institutional workshops and sensitization might be relevant to help in the institutionalization of OGD in Ghana but the process of institutionalizing data publication is yet to be realized. Also, issues such as proactive sharing data and reasons why OGD is yet to be institutionalized despite the passage of the RTI law was not discussed. The availability of financial and knowledge resources needed to ensure the data/information was shared by public institutions were not discussed. The workshop attendees included directors of the public sector and no other public or civil servants who worked directly with institutional data/information. In addition, through constant real-time monitoring of parliamentary proceedings and using available data provided by parliament records Odekro (a non-governmental organization) was able to unpack events of parliament and communicate them through reports for citizens. For example, one of their publications focused on the rate at which parliamentarians participated in discussions and the rate of absenteeism and its effects of national development. By using an in-house software and a pre-determined algorithm available data was analyzed using both qualitative and quantitative methods (Ekow et al., 2017; Odekro, 2016). Odekro's report on the sixth parliament showed the adverse effects absenteeism and lack of participation by parliamentarians had on the country.

“Based on the data available to use, we identified that the average Member of Parliament missed 24% or 1 in every sitting between January 2013 and July 2014. Regular attendance by Member of Parliament to parliament was required for active citizen representation and effective governance” (Odekro, 2016).

Table 15: Data Sharing Culture: Coding Referencing

Data Sharing Culture: Coding Referencing	
Node	Number of coding references
actors\\DPs 1	17
actors\\DPs 2	11
actors\\PS1	5
actors\\PS2	6
actors\\PS3	3
actors\\DU1	4
actors\\DU2	5



Data Sharing Culture: Coding Referencing	
Node	Number of coding references
actors\\DU3	7
actors\\DU4	6
actors\\DU5	10
actors\\DU6	9
actors\\DU7	11
actors\\DU8	5
Data sharing culture\\positive	11
Data sharing culture\\negative	19
Data sharing p\\organizations share data in a proactive manner	5
Data sharing culture\\organizational attitude	18
Data sharing culture\\individual learned practices use\\individuals influence org.	20
Data sharing culture\\influenced by resources\\unintegrated and semi integrated systems	10
Data sharing culture\\caused by institutional factors\\influences publication and use	26
Data sharing culture\\data as a property to own\\influenced by primary source	29
Data sharing culture\\data as a property to own\\influenced by ownership and control	18

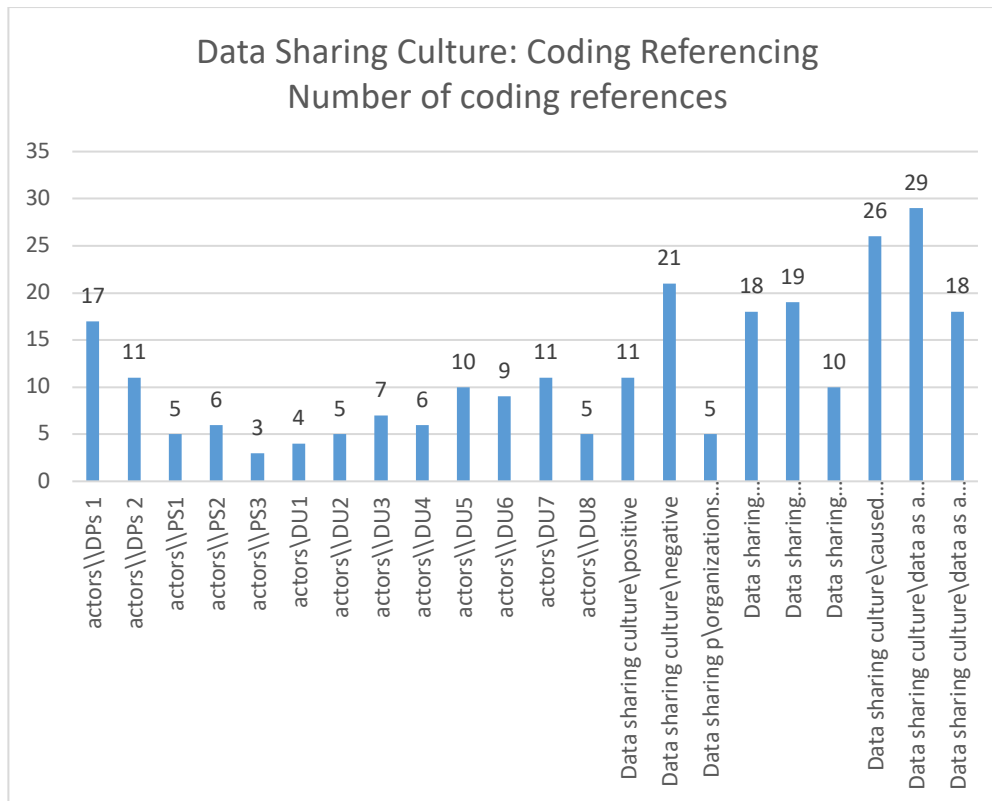


Figure 9: Coding References for data sharing culture

7.3.8 Controlling Data

Controlling data is a practice that emanates from the desire to protect accumulated data. The perceived aim of controlling data was to ensure the integrity, originality and authenticity of data. The need to protect data emanated from the view of actors on maintaining the ‘value’ of data in their possession. The ‘value’ of data was described as maintaining data in its original format based on the acceptable standards of the institution. However, an analysis of this theme from the empirical findings revealed that controlling data negatively affected data publication.

“We can only use what is made available to use. I believe there is a little misunderstanding of how to ensure that original data does not lose its value. So, they try to exercise some form of control. It may be fear though” [DU1].

“People should come to us when they need our data. We have to know who is using what at what time and for what purpose” [PS1].

“It is good to know who has access to it and who is using it and what they are using it for. We need some kind of control over the data” [PS2].



“We have our own rules that must be followed if you want to use our resources. It is also about controlling who goes out and who uses it” [PS3].

7.3.9 Institutional Personalization

Institutional personalization of data occurs when institutions consider data in their possession as a ‘property’ of the institutions, thus requiring institutional control and protection. Institutional personalization of data unearthed the desire to control the data both within and outside the institution boundaries. Institutional personalization was birthed out of resources such as organizational time, money and skills used to collect, process, and storing data; there was a desire to exert some kind of influence. In addition, the use of integrated system led to the development the institutional personalization. Some of the participants elucidated that time and money invested in 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, so the integrity and authenticity of the data will be preserved. Institutional personalization of government data further resulted in the desire to continuously monitor or control data use which influenced both OGD publication and use. Institutional personalization resulted in the claim of right to control data within and beyond institutional boundaries. Data control by institution may be attributed to the desire to maintain the integrity of data.

“You know they spend a lot of time and money into collecting, process and storing the data so, I think leads to that feeling of the data belongs to that particular institution” [PS2].

“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 [...]. It is tough you know” [PS 3].

“We have to ensure that we are not misrepresented. We must see to it that what we collected and what we wanted to convey is done corrected. And how best can we do this if not by keeping an eye on it” [PS1]

“You know intermediaries have the tendency to understand our data in a way that it is not meant to. Just cleaning or filtering data can lead a total change and communicate things we did not intend to. So, we need to monitor it [...].” [PS2].

“We have to be aware of what our data is being used for. It is about doing what is right. Some of these NGOs, they take our data make money out of it and sometimes they don’t even acknowledge us. So, I think it is fair to be aware of what our data is being used for. How do we do this if we don’t control it? If you need data you have to come to me, tell me what you are going to use the data for [...]” [PS 3].

The subject of control was further mentioned in the 2016-2017 Action Plan Report. Data controllers in this report were explicitly linked with data ownership. Although the document mentioned the concept of data controllers, it failed to provide detailed explanation on it and its possible implication of the OGD movement in Ghana. But recognizing the existence of data controllers validates the empirical findings on data control.

“During the Action Plan Period, GODI will work towards improving the efficiency of the Open Data portal (data.gov.gh), data collection, capabilities of data controllers [...]” (Public Sector Reform Secretariate, 2016).

7.3.10 Fear of Loss of Control

The interview respondents explained that some public institutions felt releasing data meant a loss of control of what belonged to the institution. The fear of data loss was attributed to the need to feel a sense of control over data that the institution gathered. DU noted that the fear of losing control over data once it has been published online has negatively influenced OGD publication in Ghana. In addition, they argued that other actors in the ecosystem had to publish data for others to use did not mean loss of control. Hence the fear factor had to be curbed. The fear factor was also attributed to the end product of data use. For example, some of the intermediaries created applications while others wrote reports in the form of stories to trigger societal changes. These interventions, although were made possible due to the data published by other institutions, the credit or recognition for the interventions went to the intermediaries and not the data publishers. Thus, the roles intermediaries played and the activities they engaged in the data life cycle triggered the fear of loss of control factor.

“People feel they will lose when they share the data that they have. Data is like a source of power to them. And telling them to give it to use is like stripping them of that power [...]” [DP2].

“We have to understand that releasing your data does not mean the loss of control over the data. We only control data as users by the way we understand and interpret it and the product or policy that



results from data usage. But we can't control the data. We did not collect it. We are only users" [DU1].

"The control thing is real, but how do expert citizens benefit by controlling their data? You restrict how the data is used" [DU 5].

"Our data is always on our website. For us as an institution, we seek to make our data available, that is our mandate. But I can't say same for other institutions. Data control exists but not here" [DP1].

"If we are able to develop an application using data that we have not collected does not mean we control the data. We may control the application but definitely not the data which we can't even change" [DU8].

The empirical data revealed that some DU had a perception of data control when they started to engage in data collection, processing, and storage. These DU involved in data collection but were not willing to publish the data. They also institutionalized a bureaucratic process to protect the data they had, which with time became an acceptable standard. Thus, other users who needed their data had to go through an institutionalized process for access to the data.

"We have reasons why we do not give our data out [...] there is a lot of competition out there, and we have to protect our interest. And a lot of time and money into it. We do a lot of stuff with the data we collect. It is in our best interest if we keep it" [DU 5].

"[...] we think it is fair, we spent a lot in accumulating the data we have. It is only fair to try to exert an amount of control over it. We give it out, but you have to follow the due process to get access to it. We don't sell it anyway" [DU8].

"We have our own mappers who serve as data collectors. I cannot really say we will not also want to keep an eye on our data if it crosses our gates" [DU7].

7.3.11 Right to Access Data

Within the concept of data control, DU expressed that it was their right to access, use and reuse government data without the idea of being controlled. But some PS explained that it was their right to control how their data was used and reused. Some actors argued that the potential impact OGD use can generate should trigger easy access. Although some DU claimed the right to data, the irony lies their quest to protect data that they as DU had accumulated as an organization.

“The data belongs to all of us; we need it to create innovation for the ordinary Ghanaian who does not understand these things. It is more about trying to control what belongs to everybody” [DU4].

“We are part of the OGD movement, so to me having access to data becomes a right. There is no need to control it leading to over protectiveness of something that is for everyone” [DU5].

“Data is for citizens; the data is about them anyway” [DU1].

The above explanations and quotes from interview participants on data ownership, data sharing, and data control revealed an unintended consequence of OGD from the context of a developing country. The myth of OGD is encompassed in automatic data availability and reuse, which was the intended consequence of signing to the OGPI movement. However, critical consideration was not given to already existing social and normative practices and patterns that have been created and recreated by actors and existing structures within the ecosystem. This has therefore resulted in inadequate recognition and the call for the application of contextual change management methodologies and theories.

Table 16: Control: Coding References

Control: Coding Reference	
Node	Number of coding references
actors\\DPs 1	10
actors\\DPs 2	9
actors\\PS1	7
actors\\PS2	5
actors\\PS3	6
actors\\DU1	11
actors\\DU2	9
actors\\DU3	8
actors\\DU4	6

actors\\DU5	3
actors\\DU6	5
actors\\DU7	4
actors\\DU8	4
actors\\experiences, history	17
actors\\roles	19
actors\\views	10
Control	21
actors social construction	20
Individual control	16
Institutional control	18
Organizational Control	22
resources, time and money	10
Right to control use	11
control over data	13
control organizational resources	8

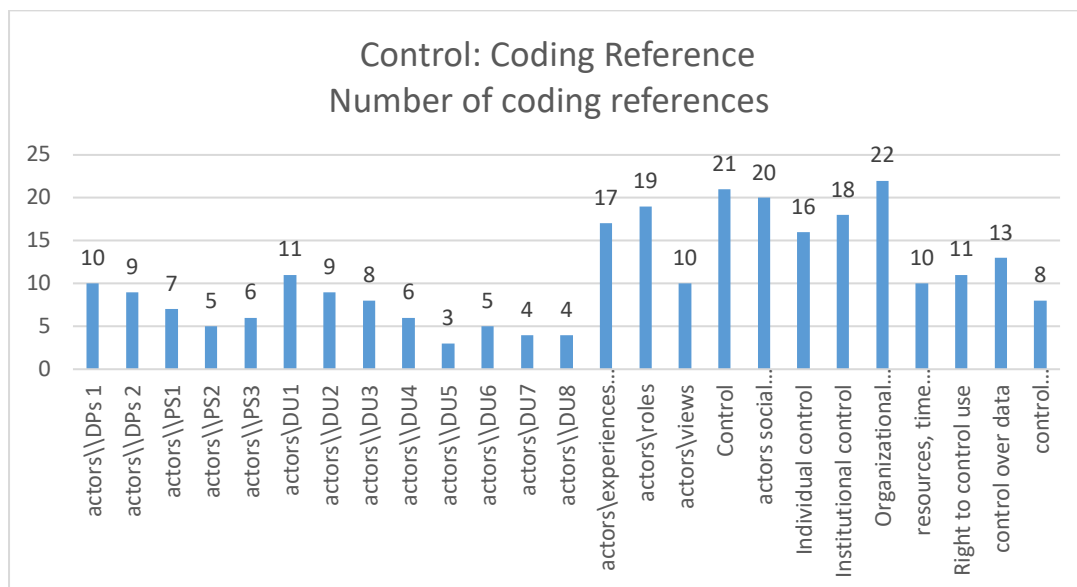


Figure 10: Control code references.

7.3.12 Data Quality from the Perspective of DP and PS

DP and PS identified data quality as a crucial part of government data. From the perspective of the interview participants, each organization had uniquely different scientific process of identifying and determining data quality before publication.

7.3.13 Identifying Data Quality via Institutional Methodologies

DP1 and DP2 identified gaps pertaining to data quality. Both publishers were mandated by government to accumulate and technically publish government data from the various ministries, departments and agencies. Data that were submitted to the publishers were not immediately published on the approved web portals. The interview respondents explained that from experience they knew that most of the data that came to their institutions did not meet their standards of quality. Hence, the submitted data had to be re – examined based on the approved institutional methodology before publication. A complexity was unearthed in the different approaches used by the two DP as well as some PS. Although they all used scientific methodologies, they differed from each other. The question here was why they had different scientific methodologies to address the data quality gap before publishing government data.

These institutional methodologies with the exception of DP2 had been in existence prior to the beginning of the OGPI. The emergence of OGD thus rendered these institutional methodologies problematic. As explained in a report by Verhulst & Young (2017):

“Data quality challenges have been attributed to “weak scientific methodology [...] example security flaws; individual and institutional norms and standards of quality (e.g., weak scientific rigor in analysis); legal confusion or gaps; or marginalized businesses and other incentives [...]. Each stage of the data life cycle contains risks. Risks associated with technological weaknesses” (Verhulst & Young, 2017, p. 35).

“Data scientific methodologies can be challenging. It has to the right thing from start to finish especially in this era” [DP1].

“May be our major problem is the different scientific methodologies used organizations. Yes, we might be different but when it comes to methodologies that govern the data life cycle, we should have a common structure” [DU2].

Although the study affirms the above claim by (Verhulst & Young, 2017), the findings unveil that risks were not only technological but also human. There was evidence of scientific methodological misappropriation and human attitudes towards change.

“I can tell you that the methods we use to collect, process and store our data is good. We have been using this for a long time, some parts were adapted from international organizations. Our methods start right from how we select our data collectors, how we handle the data when it gets to us. We made some changes because of technology, but it is not that much. To me the best thing to look at is, whether it is working or not. And my answer is, it is working well” [PS3].

The researcher was not given details of what the institutional methodologies comprised of. The interview respondents provided brief explanations for further interpretation by the researcher. These scientific methodologies were organizationally approved to encompass all the aspects of the data life cycle. Some of the interview participants referred to them as quality control measures meant to ensure that data was of quality from the start to the finish of the data life cycle. Although the methodologies were different each organization saw its own as distinct and capable of ensuring that the data accumulated by the institutions were of quality.

“We have an institutionally approved methodology that works for us [...] we use it for data collection and also to access the data of other institutions before publishing and our review it based on previous experiences. We frequently update the methodology, as we speak, we are working with some international organizations in line with our methodology. We are constantly adding different features.” (DP1).

“We have organizational control quality measures that we always put in place and it is usually monitored throughout the process. We normally use what we call organizational workflow. The workflow is briefly made up of some processes that include both people and documentations. So, the data from other public institutions is taken through that workflow before it gets published” (DP2).

“The value of data could be high depending on quality, accuracy and how it was used, adding value of data under development could not be over emphasized. However, that data could be useful only if it was in open form so that people could use it to enhance economic benefits” (Data Scientist) (BusinessGhana, 2018).

Table 17: Data Quality: Coding References for DPs and PSs

Data Quality: Coding Referencing for DPs and PSs	
Node	Number of coding references
actors\\DPs 1	18



Data Quality: Coding Referencing for DPs and PSs	
Node	Number of coding references
actors\\DPs 2	11
actors\\PS1	8
actors\\PS2	5
actors\\PS3	7
actors\experiences, history	15
actors\roles	7
actors\views	9
data quality	25
Dataset quality\critical requirement for publication	21
Data quality\critical requirement for data collection\data life cycle	20
Data quality\use of scientific methodologies	17
Data quality\joint dataset quality assessment by organizational actors	5
Data quality\influence of internal teams	8
Data quality\influences publication and use	21
Data quality\existing challenges with scientific methodologies\different methodologies	18
Data quality\challenges\frequent updates of the methodologies\DSs	11
Data quality\challenges\frequent updates of the methodologies\PSs	4
Data quality\challenges\institutional nature of scientific methodologies a challenge	11

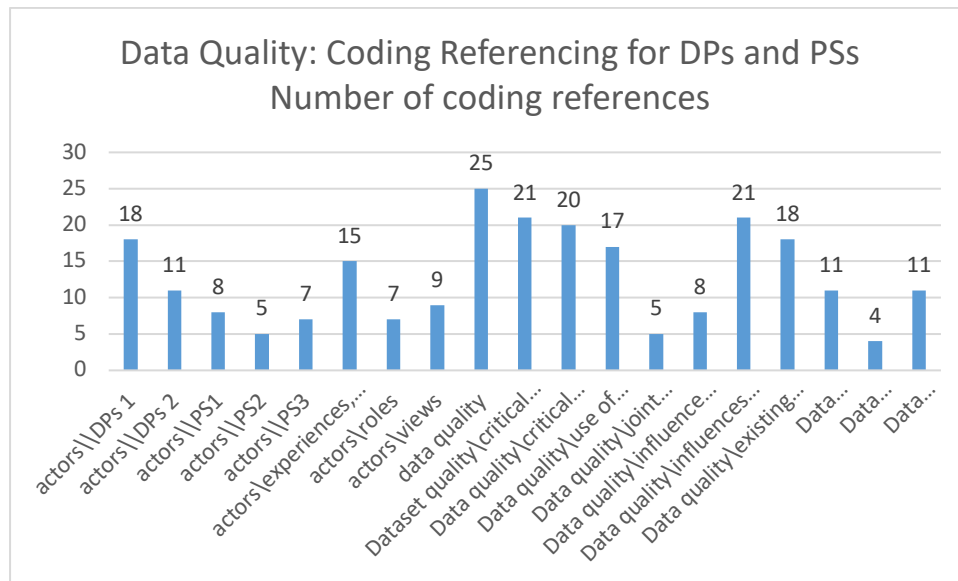


Figure 11: Data Quality: Coding Referencing for DPs and PSs

7.3.14 Resources

Data were categorized as a resource that could prompt progress when published and used. Such development may be in the form of economic and social interventions. Hence, data availability or publication generates benefits when used. Additional essentials needed to accumulate the data were also viewed as resources. These resources included time, money, skills, knowledge, technology (hardware, software, internet), paper, printers, tablets/notebooks and experiences. These were broadly categorized into technological, financial, and human resources. The interview participants perceived resources to play an inevitable role in both OGD publication and use. Therefore, publishing and using data were expected to lead to developmental activities.

The developmental activities were dependent on data publication and use and the availability of additional resources like skills, knowledge, financial and technological resources. Adequate skills and knowledge in all the data life cycle stages was a necessary requirement for both data users and data publishers. These skills and knowledge were obtained through education, training and experience (years of service). Actors or employees of both DPs and PSs were expected to possess specific skills and experiences. Those who did not have these skills were trained. This was a critical requirement to handle the complexities associated with collecting, process, storing, and disseminating government data. These skills and experiences were acquired over time through training and exposure. Building the capacity of actors was



understood as an essential organizational resource that influenced OGD publication. Employees should possess the right skills and experience to adequately harness OGD capabilities. The kind of skills and experiences needed were organizationally specific. There was an uneven distribution of resources between the two DP and the PS. The empirical findings and the researcher's observations support the previous claim. The researcher observed the use and dependence on technology among some interview participants while others had no or limited access to technology.

"We have all the resources we need, our team [...] knowledge and skills required to make good data available. We have been doing this for years, so we understand exactly what we are doing. We have a website; we now even have a section that links data with the SDG indicators" [DP1].

"Our website is currently being revamped; we are doing this in collaboration with one of the NGOs. We have all the resources we need. We have been doing this for a long time" [DU1].

"We have all the resources we need to publish the data but remember that we don't collect it; we only publish what we get" [DU2].

"The problem is that we don't have equal access to all the resources that are needed to make open government data a success when it comes to publication. Some have more resources than others. We can say that the experiences and skills available for manual data collection and processing are more than the technical skills and experiences" [DU1].

7.3.15 Human Related Resources

The concept of OGD is well understood by the two data users. However, it was yet to be understood and institutionalized by public sectors. Findings from the empirical data revealed that publication of data was yet to be institutionalized by public sectors due to the knowledge and skill gap. The skills and knowledge of DU and PS were considered as a resource that influenced OGD publication. The challenge of migrating available data from paper-based to electronic or machine-readable formats was one of the factors influencing the successful institutionalization of OGD in Ghana. Although data were available in paper-based formats, some organizational actors did not possess the required technical skills and knowledge in migrating the available data into machine-readable formats. Organizational actors who had the necessary skills and knowledge to help with the migration was met with stiff opposition. The opposition was due to fear of job loss and control. Possessing the required skills and subsequently, the needed symbolic capital had financial implications either on the individual

or the organization. That is money, was spent on or by actors to train and gain the necessary knowledge to give them the skills needed to enable them to perform their tasks effectively and efficiently.

“But I think what is lacking with this movement is that some of the institutions that collect and house data in Ghana lack the human skills and technological resources. I know a particular ministry that should have been able to provide enough data to help with this Open Cities Accra Project, but they don’t have the necessary human resources and skill and even technology [...]” [DP2].

The data is there but there are all stacked in paper -formats, the skill sets needed to migrate them and publish them is not there” [DUI].

We don’t think there is a skill and knowledge gap; those people are experienced even more than some of use. They have been dealing with data before this open-era thing. We think it is something other than a gap in skill and knowledge” [DP2].

“Migrating the data to electronic formats does not only mean making data available it also means some people who lose their jobs or they will have to divert. Intensive education on OGD is needed for every public sector” [DP1].

7.3.16 Technological Resources

Technology was considered essential and a requirement in all the stages of the data life cycle. Technology was essential for developing the required scientific methodologies for data collection, from the analysis stage to the publication. Technological resources included access to adequate hardware, software, the internet, and infrastructure. The reliance and relevance of technology were viewed differently by the DP and PS. The two DP considered technology and its related infrastructure as a backbone to their organizations based on their background as data publishers. DP1 largely relied on technology throughout the data life cycle. Having the needed technology and its related infrastructure was critical to decision-making, included data-driven decisions. Although access to technological infrastructure was critical, the cost of such equipment’s also played a role in its access and use by actors within the OGD ecosystem. The responsibility of DP2 was to provide technological infrastructure for the country, develop and manage the open data portal. However, PS relied on manual processes in most of their activities including the data life cycle. They were yet to migrate to purely electronic systems.



“No don’t have the latest technologies, may be it is one of our weaknesses” [PS2].

“Some of us need training with these new technologies so we can move from the old ways of doing things. I think some will welcome it; others won’t. But we need new skills and let go of the old one” [PS1].

“We are now technologically dependent throughout the data life cycle. We can say for a fact that technology is involved in everything we do for some time now. We use tablets to collect data. The data is updated as it is being collected.” [DP1].

“Having the right technology is important for data collection and publishing; even using available data requires effective use of technological resources” [DP2].

“Technology is important in what we do. But you must also consider the cost. You know eer, internet is expensive in Ghana and it is not readily accessible throughout the county. This makes the use of technology in throughout the data life cycle challenging” [PS3].

“I think some of them have, but the question is it adequate? If we want to change things by making data accessible to all, we have to ensure the right tools are in place [...] by saying the right tools, I mean technology and all the things that come with it” [DP2].

7.3.17 Financial Resources

Though access to financial resources was a challenge among PS, DP did not face the same challenge. DP easily accessed funds through national budgets and institutional budget allocations. DP also worked with multinational organizations, which boasted their access to extra funding that enabled them to acquire new technologies and skilled personnel who assist in data collection. DP1 for example, was able to acquire tablets that made data collection and processing efficient and effective.

“It is not just about the skill set that is inadequate; funds are also important. We have but it is not adequate” [PS1].

“To publish quality data, you need money, I can’t say we have enough” [PS2].

“Funds are not easily accessible, but we manage to get some through the allocated budget and institutional networks” [DP1].

“We have some of the needed money to run and make data available” [DP2].



Table 18: Coding References for DP and PS on Resources

Resources: Coding References For DP and PS	
Node	Number of coding references
actors\\DP 1	5
actors\\DP 2	4
actors\\PS1	3
actors\\PS2	5
actors\\PS2	2
actors\\experiences, history	10
actors\\roles	2
actors\\views	1
resources\\technological	9
resources\\critical for publication	10
resources\\requirement for data collection	11
Resource\\financial resources	5
resources\\human\\skills\\knowledge	9
resources\\needed by organizational actors	10
resources\\influences data capture and storage	8
resources\\organizational\\influences publications	9
resources\\an existing challenge	4
resources\\human capacity lacking	7
resources\\use	8
resources\\institutional requirement	5

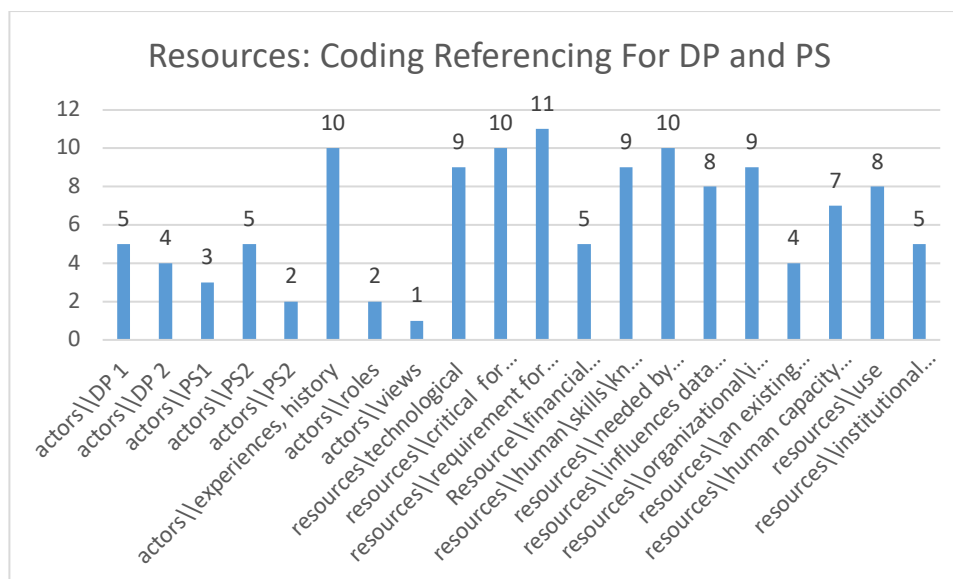


Figure 12: Coding References for DP and PS on Resources

7.3.18 Regulatory mandate

The regulatory mandate addressed the legal component of publishing data in machine-readable formats. As stipulated by the OGPI signatory countries were to ensure that data was legally open. Implementing the Right to Information (RTI) law, although was a requirement for ensuring data was legally open, the empirical data showed the existence of other national and institutional laws that influenced the OGD publication. The empirical data explained the importance of ensuring that the legal requirement of OGD was obeyed. The existence of these laws either inhibited or enabled OGD publication and its subsequent use. Despite the law that requires the publication of data by government institutions, empirical data showed the possibility of the limiting effects of the law. Aside these legal requirements organizations may have their own rules that govern data use.

“This movement is backed by laws such as the Data Protection Act, Privacy Act, and the Right to Information Act (yet to be implemented). What we need is create awareness and strategies on different ways of implementing them” [DP2].

“To even consider pursuing data-driven innovation, data users need to be sure that they have the legal ability to download, analyze and publish open government data in whatever way they see fit. Legal frameworks that clearly support the right to republication can promote innovation and experimentation with data” (myjoyonlin,2019).

“But journalists and activists worry that the new legislation [...] could be used as a tool for government to limit how journalists’ share or leak information on popular online platforms like Facebook and Twitter. Social media has played a prominent role in allowing investigative news to flourish by enabling journalists and citizens, often anonymously, to release leaked government documents” (Ghanaweb, 2017).

To this effect, both government and NGOs organized workshops that acknowledged and connected the diverse nature actors in the OGD ecosystem intending to implement the RTI. Successful implementation of the RTI required implementation strategies that recognized the views and impact of the multiple stakeholder nature of the OGD ecosystem.

“The Ministry of Information organized a multi-stakeholder workshop that stipulated the roadmap for full implementation of Right to Information (RTI) in 2020. The essence of collaborative effort was discussed as important in the implementation process. Participants at the workshop were from different state agencies and civil society groups” (source myjoyonline.com, 07/10/2019).

“a joint stakeholder workshop on effective strategies to implement the RTI was organized by Penplysbytes, ChriAfrica and PN Africa Watch” (source Facebook, 29-10-19).

7.3.19 Institutional Regulations

There were regulatory concerns about the existence of institutional laws the governed data before implementing of the RTI. The empirical data revealed that some interview participants were unaware of organizational laws that governed government data, especially regarding availability and access. Interview participants explained that reference to rules they were unaware of influenced their decision-making processes and the possible effects on OGD publication. They also acknowledge the possible conflicts between national and organizational laws that support OGD. Some interview respondents suggested that it was important to have different legislative implementation strategies and standards, due to the conflicting nature of different rules and inadequate awareness. Sample quotes speaking to this theme are:

“There are the OGPI action plans, I can say it is a requirement that that helps in OGD implementation. I think with the action plans; we are doing very well within the sub-Saharan region. And it is what is really governing the movement” [DP1].

“We have laws that work for us; it is currently undergoing review to implement a few clauses. For us as an institution, the law mandates us to publish our data [...]” [DP1].

“If you need data and you go to them, they will tell you they have laws and we have to be aware. But where are these laws? Many national laws that guide this movement.” [DUI].

7.4 Empirical Scene 2: OGD Use

This section presents the findings on OGD use. The diagram below provides a pictographic representation of socially constructed practices and patterns that influenced the use of OGD from the context of a developing country. The relationships that exist between these social constructions were also identified. Although themes such as resources and data quality influenced both OGD publication and use, the explanations to each theme from the empirical data provided diverse understanding and interpretations.

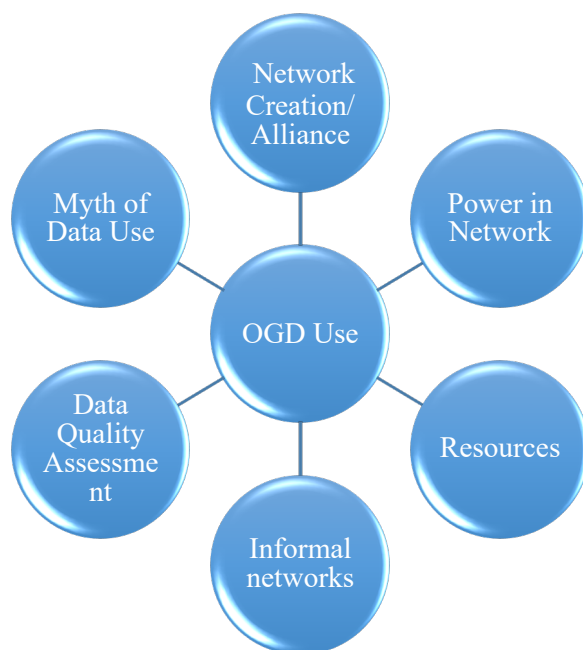


Figure 13: Emerging Themes-OGD USE

7.4.1 Alliance/Network Creation

DU intentionally and unintentionally created networks. Networks/alliances were social connections created between DU, international donor organizations, national technology enthusiast, and government institutions. These networks were formed for different purposes. The purposes ranged between financial, technical resources, and data access. These networks provided a type of social connectedness, which was established as a means to express power with regards to access to data (that should otherwise be open), funds and as a source of competitive advantage. Social connectedness was established through friendship. Friends were



colleagues from former places of employment or old school. It also included close or distant family relations and acquaintances of family members. Building social connections within the OGD ecosystem was deemed as a requirement because it provided both social and technological exposure to DU. Most of the DU used available data to tell stories or create technological mobile applications intended to trigger social conversation and create an impact. However, most of the DU were in existence before the introduction of the OGD movement in Ghana. The OGD movement and created networks increased in the incorporation of government data into their routinized activities and structures.

Networks were used as a means of interaction between DP and DU. This interaction was required to either enable quick access to data or provide additional understanding of the available data, which was intended to be used. This was primarily used in situations where Metadata was not available or data requires further clarification from publishers. The following quotes provides additional elaboration:

“It is better to know someone in the department. It makes it easy. Sometimes we get data quickly from some institutions that we have connections or friends there [...] hmm, I need is to make a call [...]. If I need data from institution Z (pseudonym), all I do is call a friend of mine there; it is quick. We are lucky to have that” [DU8].

“In general, I will say who you know is important here. And that person has to know you too so that in case you need data it can be fast track” [DU6].

“You have to know someone who has access to what you need and is willing to give you the kind of data you want. I mean the right one” [DU 5]

“We have colleagues who left here to work at some of the institutions. So, we use them” [DU7].

“We have managed to create alliances between us and some multinational organizations. These connections are necessary for financial stuff, knowledge sharing and exposure” [DU4].

“If an NGO has a good course that requires the use of available data to make life easy for citizens, we go in to offer some financial support in the form of grants. The grants enable them to make their solutions scalable” [DU1].

Though DU placed importance on forming networks or alliances, the empirical data showed some misconceptions about the influence of these networks and why they were created. The



interview respondents from the DP recognized the existence of networks\alliances created by DU. However, they claimed the international networks\alliances were formed either for financial benefits or produce reports and not because of the intension to use data to create impact. However, from the perspective of DU.

“[...] there are some NGOs when they have an agenda, they don’t think data. All they are interested in is doing something just to create connections. So, they produce lots of reports but don’t have data as the foundation” [DP2].

“Yes, they form them, but the question is what is the real intention for forming them, especially the international ones?” [DP1].

“If they form it for data access, maybe I understand from the national point of view because of the challenges which will change soon. But why the international ones” [DP2].

7.4.2 Types of Networks/Alliance

Networks created by DU can be categorized two: (1) National Networks, which was sub-categorized into networks created between DU, PS, and DP, and networks created among DU; (2) International Networks.

7.4.2.1 National Networks/alliances

National networks/alliances were created internally within the country and were not guided by formal rules. They were created as a form of normative social connectedness. These relationships were normative because rules were unwritten, and violation of such unwritten rules was not punishable by law; rather it attracted a process of conflict resolution of a break away from the network. Social connectedness was relationships that were established between individuals known in the same social cycles such as colleagues, friends, and family. There was evidence of exchanges within the networks. Such exchanges included access to data, resources, training, and funding.

“We have connections at some of the public institutions. So, when we want datasets on something, we just contact the person for help. We try to skip the bureaucracy” [DU1].

“Some of the ministries are doing very well; they have the data for the things we do here. The only thing we do is make a call and contact an old colleague there. We also have friends we met at trainings, and conferences. We rely on them when the arises” [DU8].

The researcher observed at one of the workshops I attended how the national networks were created. The DU initiated creating the network by inviting key people from some public sectors to speak at the workshops organized in their area of specialisation. Attendees continued to interact after the workshop and exchanged contact information. Upon further enquiry, I learned such networks/alliances were created for future use.

7.4.3 Network/Alliance with PSs and DPs

DU created different national networks with DP, and PS. These formed networks became a necessity due to delay and failure to publish both current and historical data as stipulated by the country's partnership with the OGD. Hence, social connectedness was used to create and re-create networks between DU, DP, and PS. Such relationships were created to aid in quick and easy access to data and address data irregularities that may affect data quality.

"[...] I think we get data from that department because one of our colleagues now works there, so it is quite easy for us. But some of them are doing well. it is just that we need the data as and when it happens. We don't want to read it in the news that does not guarantee quality" [DU3].

"a friend of mine happens to work there, so we use him when necessary. But there are times extra help is not needed because the dataset is online" [DU6].

"For us, these networks work best when you want to avoid public sector bureaucracy. You know [...] go here, go there. If we want data fast to finish a project, social connections become important" [DU7].

This network/alliance also led to sharing knowledge and skills on data and its related activities. For example, to overhaul the OGD web portal in Ghana, training sessions and workshops were organized to enable DU to share their knowledge and skill with DU and PS. In addition, the importance of sharing government data through publication on the recognized web portal was discussed and the necessary training was conducted. However, institutionalizing OGD through frequent uninterrupted publication and use is yet to be institutionalized.

"Series of training sessions were for staff members of selected government agencies were organized. The focus of these training sessions was to educate them on innovations and policies that had been realized through the use of OGD. And build their capacity by equipping them with the prerequisite skills in uploading data on the platform. The training sessions also gave staff members the



opportunity to interact with data users, data scientists and data enthusiasts” (Sabblah, 2019).

7.4.4 Network/Alliance among DU

Although there was a competition between the DU, data quality challenges led to forming networks/alliances between them. This type of network/alliance was used to discuss data quality before use. Some of these alliances/networks were motivated by multinational organizations. They existed with an aim providing multi-stakeholder knowledge on data quality. Though some of the DU worked together on some data-driven projects, such networks existed temporarily until the project was completed. There was also evidence of permanent networks created among DU, however, the researcher discovered that same team headed them. Thus, the organizations had different names, websites, and logos but were owned and managed by the same team.

“We have different strengths; it is necessary to form alliances with people like us. I mean those in the same field as use. It helps to rely on and draw strength and knowledge from others” [DU3].

“We each other [...] we are competing, but we create these groups to help understand what some datasets mean” [DU5].

7.4.5 International Networks/Alliances

International networks were established for exposure and funding purposes. Availability and access to funding and exposure were regarded as a form of value. To DU, the more international organizations they were aligned with the greater the value they perceived to have over others. Such value was determined by funding and exposure. Another angle of attaining value by DU was the use of social connectedness to get access to unpublished data. DU mostly displayed on the names of different multi-national organizations they partner with as a source of credibility on their websites. Such networks were also used as a competitive edge over other DU within the ecosystem. The networks included contractual and non-contractual relationships with multi-international donors, national PSs and DPs. The number of multi-international donors listed on the website of a DP signified the organization’s collective power and exposure.

“It is not only about the financial resources; we also get technological help and training of our workers” [DU 5].

“We are supported by different organizations; it is needed for exposure [...] they are mostly international. You must be connected since your connections gives you an advantage over other organizations. Knowing the right people in this space is necessary,

not just nationally but outside Ghana. You know these international connections are helping with the financial resources [...]. You can go to conferences and learn from others doing the same thing” [DU2].

7.4.6 Data Communities and Data Teams in Network/Alliances

Data communities were a network or alliance that consisted of selected members from DU, DP, and PS while members of data teams were selected from each DU organization. Participating data communities and data teams were experienced and knowledgeable in open government data. Their knowledgeability and experiences also included technological and data analytical skills. Members of data communities were not necessarily acquaintances; they were brought together briefly to collaborate and discuss issues concerning OGD. The issues included accessing data quality from a collective perspective. The composition of the data community changed depending on the dataset at hand and the expertise needed. Data teams were formed by DU who are tasked with using data to create impact by ensuring that the dataset used were of good quality.

“We need to see more initiatives where data users and producers are in one room discussing data, we really need this. Through this we can become aware of what people are doing like who is doing economic analysis, descriptive things with government data and you have a fruitful discussion about it. And see how best this can create something for the ordinary citizen” [DU2].

“Data communities are important. It is a new thing but people are beginning to recognize the important role it plays in the OGD world” [DU1].

“We are part of the data team in this organization. Data is a big issue and sometimes the opinions of others matter” [DU3].

“Some of us get the invitations to the bigger ones, when we go there, we share knowledge and experiences. It also offers us the chance to understand others, especially those whose data we use” [DU5].

7.4.6.1 Power in Networks/Alliances

Both local and international were established to ensure that government data was technologically and legally opened. The data was also expected to be reusable and create value for citizens. These networks led to the creation of power-related structures that were founded



on DU access and use of government data. The type of power emanated from the ability of the DU to control or influence the activities of DP and government at large. Actors displayed power in these networks in informal ways because there were no laid down rules to follow. For example, being part of networks/alliances gave DU power to decide data quality from multiple stakeholders' perspective. This was accomplished through learned and acquired skill, knowledge, experiences and technological tools. The changes and responses within the OGD ecosystem would not have been possible without the actions of the socially created power in networks. DU through networks/alliances were able to mount pressure on the government to pass the RTI Bill into law. After the passage of the RTI bill into law, continuous pressure was mounted through radio discussions and social media to set up strategies for successful implementation of the law. The power that being part of networks/alliances gave actors influenced both OGD publication and use. This theme is essential despite the challenges of OGD institutionalization in Ghana. These are some quotes for elaborations.

“With the right networks, you can have enough power to trigger changes in polices and lifestyles” [DU2].

“Relying on shared knowledge from different organizations and people enables us to have some control over data especially determining it quality for use” [DU5].

“Data in itself is a powerful weapon. Having access to the right quality data” [DU2].

“We have written reports that has changed the outlook of parliament. And to us that is power in the hands of citizens. What is needed is the right people to give you the right data” [DU8].

“We are mounting pressure as a group. What we keep saying is that the right data must be published. It is not just any data. Quality data also matters” [DU1].

“We put in a lot of pressure to make sure the RTI was passed into law. Now our next focus is to see its actual implementation” [DU3].

“The RTI coalition expressed the need for government to pass and implement the RTI at both regional and international levels. The coalition, therefore, advocated for international agencies to make recommendation to Ghana to speed up in passing the RTI bill into law. This call was made after previous recommendations by countries failed to help the country pass and implement the RTI law” (MyJoyOnline, 2017).



The researcher was invited to one of the meetings of the data communities and meetings with data teams. Though the members did not exceed twenty. The researcher observed that the data team was made up of knowledgeable and skilled selected from individuals from PS, DU, and DP. The PS and DP were invited to the meeting; hence they were given the opportunity to select their representatives. DU organized the meetings and extended the invitation. DU had more representatives than the PS and DP. Even though the discussions focused on particular datasets, there was evidence of domination which DU exercised. The domination was evident during the discussions on datasets. These individuals unknowingly took control of the meeting due to their experience and expertise. In most cases, their opinions were final decisions. In addition, the notion of power was observed during the interactions with the data teams. With the data teams, the leader exercised and exerted the most control during the discussions which were centered on determining data quality and how to use data for public good. The team leaders also exercised power over the team members during the interviews. The team leaders easily interrupted when their team members were responding to questions. They easily could quickly cut in and decide if the answers were what he expected them to give.

Table 19: Network Creation/Alliance: Coding Referencing

Network Creation/Alliances	
Node	Number of coding references for actors
actors\\DPs 1	5
actors\\DPs 2	2
actors\\PS1	0
actors\\PS2	5
actors\\PS3	2
actors\\DU1	6
actors\\DU2	9
actors\\DU3	4
actors\\DU4	5
actors\\DU5	7
actors\\DU6	8
actors\\DU7	4

Network Creation/Alliances	
Node	Number of coding references for actors
actors\\DU8	5
network/alliance\\is important	11
network/alliance\\social connection	7
network/alliance\\for funding purposes	5
network/alliance\\get access to data	12
network/alliance\\misconceptions about networks	1
network/alliance\\national networks	15
network/alliance\\international networks	17
network/alliance\\power in networks	10

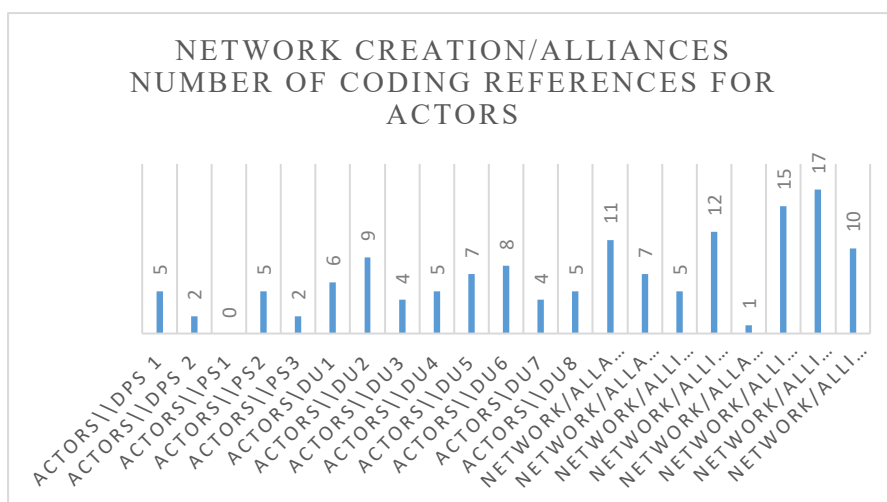


Figure 14: Plotting for Network creation/alliance

7.4.6.2 Informal Networks



Informal networks were formed to focus on individuals' creativity and development. This was to help DU use OGD to create value for citizens. DU also engaged in informal networks for mutual social interaction of OGD. These collaborations initiated social interconnectedness that influenced OGD use. For example, hackathons and roundtable discussions were frequently held. Hackathons provided a means by which government data was discussed from multiple perspectives and how available data can be used efficiently and effectively to create value for citizens. These collaborations were socially created over a while between various actors within the OGD ecosystem. Round table discussions and hackathons were also held focusing on staff from selected government institutions, data enthusiasts, data analysts, and data scientists. The purpose of the hackathons and round table discussions was to bring individuals who were involved in data publication and use together to foster OGD institutionalization.

"You know what collaboration can do? It can lead to changes in the syllabus and the practice of journalism. This new movement is creating new waves, we have to take advantage of it, but that be achieved when we collaborate as users" [DU 4]

"We organize various hackathons; what we do is we invite data enthusiasts who can and create apps by using government data. In April 2019, a hackathon was organized by DU, in collaboration with the DP. This hackathon was housed over fifty (50) data and technology enthusiasts [...]" [DU5].

"The hackathon was intended to bring together some staff from selected government institutions, data scientists, data enthusiast, data analysts, statisticians, and technology enthusiasts. The aim was to provide an atmosphere where data publishers and users to interact, share ideas, and resources that will create impact" (Sabblah, 2019).

Although informal networks were regarded as necessary, some DU expressed the view that this was inadequate from the side of DP.

"I think there are too many parallel initiatives, we need a form of integration which is spearheaded by the right data" [DU2].

But respondents from DP noted the opposite. They mentioned these networks exist and are being used to help implement different components of data openness. For example, an international network has been formed to enable actors in the OGD ecosystem to generate qualitative data with a focus on citizens.

"Having informal networks is important. As we speak, we are working with Statistics South Africa. We are also trying to use these networks to implement [...] citizen-generated data. It will be more qualitative in nature. We are trying to include more people in the



ecosystem in this process. But it's a process thing that will take some time. We need some adjusting to do" [DP1].

Unlike the DU, informal networks DU perspective were associated with the use of available data to drive and improve innovations controlled by citizens.

"GODI has created a community of common interest groups [...]. Citizen-led initiatives and projects to develop new services with applications based on available public data [...]" (GODI Secretariat, 2014).

From the perspective of DU, the essence of being part of an informal network was to enable them outcomes or results that were otherwise impossible to attain as individual autonomous organizations. Members of informal networks use both tangible and intangible resources to support each other. The intangible resources mainly social capital which included providing members of each organization with social and professional influence and access to data. The tangible resources came in a monetary form, which acted as funding. The informal networks required substantial interaction and time, the essence of this was to ensure all partners attained significant outcomes. The interaction required that all actors possessed adequate knowledge, experience, and skills.

7.4.7 Data Quality

Different processes were used to determine data quality by DU, DP, and PS. Whiles DP and PS used different institutional methodologies, DU used data communities and data teams to discuss and assess data quality before use. DU also relied on other software to help them determine data quality before using datasets. The software used was either built in-house or off-the-shelf software.

7.4.7.1 Data Quality Assessment Using Data Communities and Data Teams

DU used data communities and data teams to enabled them to discuss datasets to ascertain their quality before use. Through the data communities and data teams, DU could jointly discuss and agree on what constituted quality dataset. Data communities and Data Teams were socially established as part of the road map to ensure data quality and influence OGD use. Data communities were large groups made up of OGD experts from different fields. They had special skills, knowledge, and understanding of specific OGD datasets. Contrarily, data teams were organizationally specific; they were small teams of 4 to 5 members with specialized skills to determine data quality before use.



The actors within the data teams and data communities possessed the skills and experiences that enabled them to understand the norms of data owners, the published data, and the norms of DU existing in the OGD ecosystem. Some of the skills were learned, others acquired through experiences of working. These norms included format for publishing data, unwritten rules that governed data publication and access, informal bureaucratic regulations for data access, and contact persons for data access.

The data communities and teams discussed data quality based on specific data principles they had learned over time. Members of the communities and teams laid down these principles. One of such principles was comparing datasets available on national web portals to the datasets available on the web portals of multinational organizations. This comparison was made to ensure datasets were up-to-date and the inclusion of meta data. Another principle was the use of experience, skills and knowledge by the members of the data communities and data teams. Whiles membership of data communities changed depending on the data to be discussed. Data teams did not change because the datasets to be discussed were all based on the purpose of the organization. The data communities and data teams were socially constructed and reconstructed with an aim of determining data quality and likewise influence OGD use.

Forming data teams and data communities to discuss data quality became a necessity due to the challenges associated with data quality and its influence on use. The challenges of data quality may have not been addressed at the source and from the initial stages of the data life cycle. As explained in a report Verhulst & Young, 2017:

“[...] when risks are not addressed at the initial stages of the value cycle (e.g., when dirty data is not cleaned at the collection stage) they accumulate and lead to additional risks downstream [...]” (Verhulst & Young, 2017, p. 35).

“We have to organize and have major round table kind of discussions around OGD in Ghana. [...] it is happening but on a very slow pace. You can only tell this data is of quality when it is validated by more than one person. It is about discussing the data from different perspectives. The state of quality is agreed upon through a process of conflict and conflict resolutions” [DU].

“It is very good to have data publishers as part of the data communities, it is an essential way of discussing the data to make sure that we don't compromise on quality they are very important, you won't know but they are” [DU].

“Although the process of discussing the datasets always resulted in conflicts, there is a need to come to an agreement [...] the data must be of quality and this can’t be achieved by just one person, you need the whole team on board [DU5].

7.4.7.2 Communication and Data Quality

Aside from the use of data teams and data communities, DU also determined data quality through communication with the source or data owners. Communicating with DP and PS took the form of telephone conversations. The conversation was centered on explaining the data to the potential user. This strategy took place in situations where available data did not have metadata. Direct communication with the sources of data helped address the challenges of misunderstanding and misinterpretation of datasets. Since understanding and interpreting datasets was based on the individual or group interpreting it for use, having actors the opportunity to communicate and share their knowledge on particular datasets before use increased the chance of working with quality data.

“So, government data rarely comes with metadata, so you don’t even understand the data [...]. We try to call them to redefine the terms for us. What does this mean? They tell us, and we write it [...]. So how did you arrive at this, we write it down. But our experiences of OGD have also taught us to wait for a long time to communicate with them [...] and that we don’t have”. If we have the quality data, its use will be unlimited.” [DU2].

“Sometimes, if we don’t understand something within a particular dataset, we call the source [...].” [DU4].

“You don’t have to miss the context the dataset is coming from. If that happens you might create the wrong impact and that will be a lot of trouble. So, for us the best we do is make that call. Try and interpret is from their perspective before use. It is all about quality” [DU5].

DU recognized that OGD quality has an enormous effect on OGD. However, they explained that OGD quality was a challenge that needed to be addressed. Data quality was recognized as a critical concern. The interview participants described the characteristics of data quality in the following ways:

- The provision of up-to-date data implies constantly updating the OGD portals with new data. The same datasets were compared across different platforms.



- Provision of relevant data. DU wanted frequent updated and ‘relevant’ data, which would lead to effective and efficient use. Relevant data was contextually and subjectively defined by interview participant, which was influenced by the mission and purpose of their affiliated organizations. For instance, NGOs who specialized in agriculture, gender-based issues, extractives, training, and education.
- Provision of metadata: OGD users depended on metadata to understand available data and ensure data quality. To adequately determine data quality, it was essential to understand the data available. And one way to understand data by actual and potential users was through the provision of meta data.
- Quality data was also explained in terms of its usability and reusability. Reusable data refers to data that clearly licensed as open. Data was seen as usable when the data can be understood.

Some of the interview participants expressed their views on what they understood as up-to-date or real-time publication of government data and its implications on society and organizational outcomes. They expressed their views on how real-time data was either used to address important societal issues or the devastating effects of lack of such data.

To some of the participants historical data was essential to enable them compare events and establish trend analysis for development. Although this was the case current and up-to-date data was also essential to their decision-making processes. They mentioned specific events that historical and current data might have helped address the situational challenges.

“Publishing historical government data is good, but how can we establish trends and make an impact without current data [...]. You heard about the fall army worms that destroyed several crops in the country? This is not the first time. If we have both historical and current data, then some of us can work, establish trends, and develop apps that can help the farmers quickly identify the attack at the initial stages. But as we speak, well [...]” [DU 5 affirmed by DU].

In addition, current and up-to-date data from different institutions was seen to be essential in addressing specific ideologies in the country. Data in the right format was also important. For example, some of the participants expressed that the publication of tables was not enough. They expressed that the need for interpretation of the numbers to ease interpretation and promote data quality.

“I can say that the timelier the data is, the better the quality hmmm, may be. Maybe you have heard of this story know of the misconception surrounding regional poverty levels in the county. We got a current and historical data on the standard of living per region

and within districts. [...] we discovered the existence of a community within the Greater Accra Region whose poverty level was higher than that of the Northern Regions. This triggered government interventions” (DU 2).

“People here are just used to produce table after table in their report and it is hard to understand those numbers and it is hard to understand what those numbers mean [...] because half a time you just get descriptions of the numbers” [DU1 supported by DU2].

Data quality challenges was seen as a challenge in Africa as a whole. The challenges associated with data quality was seen to have negative effect on data-driven planning. Data usability, relevance, accuracy, timeliness and interoperability were seen as some of the characteristics of data quality that need to be institutionalized in the OGD ecosystem. Data quality challenges also limits data usability as well as potential and actual impact of the data.

“[...] data quality constraints also thwart data-intensive planning in many African countries. The quality of data relates to its utility/usability, accessibility, relevance to users, accurateness, timeliness, interpretable, and comparability across different platforms” (Woolfrey, 2015).

“[...] the level of data quality on a number of data sites in developing countries and use of data is still very limited. Data quality will remain a critical a critical challenge for sub-national governments in developing countries, and it will temper potential impact” (Public Sector Reform Secretariate, 2016a)(Public Sector Reform Secretariate, 2016a)(Public Sector Reform Secretariate, 2016a)(Public Sector Reform Secretariate, 2016a)(Public Sector Reform Secretariate, 2016a)(Public Sector Reform Secretariate, 2016a).

7.4.8 Resources: Technology and Data Quality

Being part of the OGD ecosystem required access to technological resources and the human ability and capacity to use the available technological resources. The actors and organization’s ability to possess the prerequisite technical resources and knowledgeability produced power relations within the OGD ecosystem. While actors’ knowledge, skills, and experiences enabled them to engage in the activities within the ecosystem, the adequate use of the software helped them to ascertain the quality of datasets before use.

The knowledge also enabled them to understand symbols and meanings that were acceptable OGD in the ecosystem. They were able to understand and interpret available data. DU had the required technical infrastructure that enabled them use available data effectively and efficiently. It can be assumed that DU because of their prior knowledge, experiences, skills, and created networks/alliances, showed an unequal relationship with regards to OGD. This was



embedded in the privileges of the actors and thus affected their outcome, which was somewhat different from some of the DP and PS, who did not have adequate technical and human resources.

“Downloaded data were mostly entered into the software we built in-house. There are some software’s that are free and others we buy. We have a team of data experts who verified the data quality and completeness of the extracted data from different datasets. We also compare the data for interoperability and fill identified gaps” (DU 2).

“We normally use software that are available online. We have also developed our own that we use to help us identify gaps in quality of the datasets we intend to use before actually using it” [DU4].

“Using all these resources cost money. Even if it is for free, we still need the to employ people with the right set of skills to either use the available ones or build one” [DU 3].

“Of course, we cannot conclude that a particular dataset meets the standards of quality only through experience and knowledge. We need software that can confirm it for use” [DU1].

Table 20: Some Software Available for Data Users: Provided by interview participants

Name of Software	Use
Open refine	For scruffy data.
Spreadsheet	For data analysis.



Name of Software	Use
SQL	For data set description and cross query analysis
Data wrangler, CSVKit	For cleaning data.
Open Heat Map, Many Eyes, Google Fusion, Tables, and Tableau Public (<i>visualization tools</i>)	Used to view outliers and trends in current and historical data.
Yahoo!, Pipes (mapping software)	Tools that allowed the DSs to undertake quick and intuitive mapping.
Perl, PHP, Python, and Ruby (scripting language)	For data mining.
Web Framework (pseudo)	A tool that enabled data journalists work in groups.
Notepad+, VIM, Emacs (flexible editor)	For editing codes when needed.
DocumentCloud, Jigsaw	Document analysis tools.
Yahoo! Pipes, scraper wiki, Firefox plugin Outwit Hub	For webpage scaping.

Table 21: Data Quality: Coding Referencing for DU

Table 22: Data Quality: Coding Referencing for DU

Data Quality: Coding Referencing For DU	
Node	Number of coding references
actors\\DU1	5
actors\\DU2	4
actors\\DU3	8
actors\\DU4	7
actors\\DU5	6
actors\\DU6	5
actors\\DU7	4
actors\\DU8	5
actors\\experiences, history	6
actors\\roles	3
actors\\views	4
data quality\\ is essential	10
Dataset quality\\critical requirement for use	13
Data quality\\critical requirement for data collection\\data life cycle	10
Data sharing \\use of the technological tools	8
Data quality\\use of scientific methodologies	19
Data quality\\joint dataset quality assessment by organizational actors	9
Data quality\\influence of internal teams	11
Data quality\\influences use	20

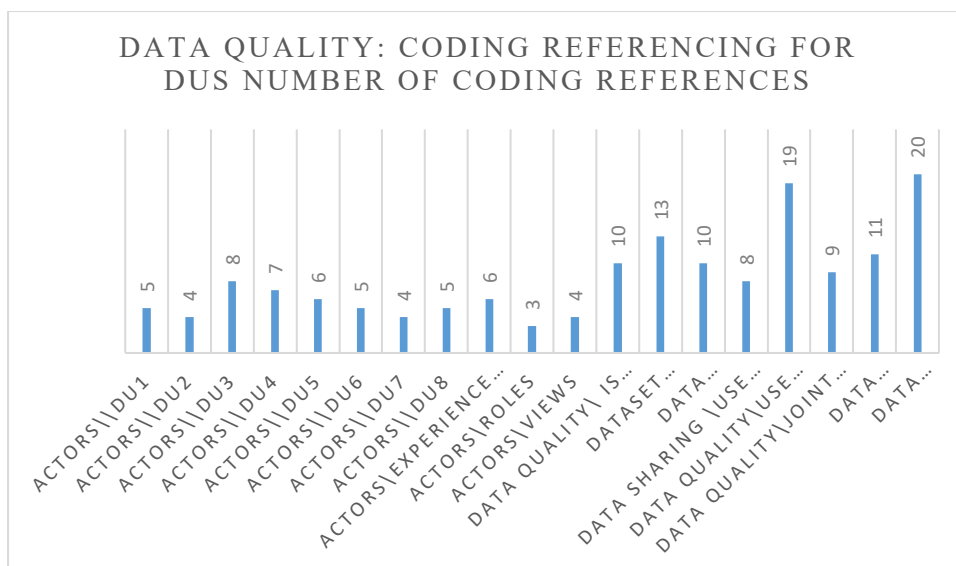


Figure 15: Data quality coding referencing

7.4.9 Myths and OGD Use

The empirical data revealed some myths that surround OGD use in Ghana. One of such myths centered on the ideology that the availability of datasets on government web portals DU will use it. Within the context of this study, DU used available datasets that channeled their course. Data from the selected DU demonstrated that they were in operation before Ghana joined the OGD movement. Some of the DU were already involved in data collection, processing, storage, and use. Data collected by the DU was directly related to the organization's purpose. The OGD movement allowed DU to use available data to support their activities. Although data became the core of these technological organizations due to the OGD movement, the datasets used were directly linked to their organizational goal. They needed datasets that were frequently updated and met their needs. Historical data was needed for trend analysis and comparison purposes.

"We have been around for almost 15 years. We have not changed what we do. We only now rely on data which helps us accomplish our goals faster. But we still do what we do even when we don't have the data we need" [DU6].

"We have been around for quite some time now. When we started, we established trend analysis and try to give famers exactly what they wanted. There were situations where relying on government data makes our job faster, easy, and less costly" [DU5].

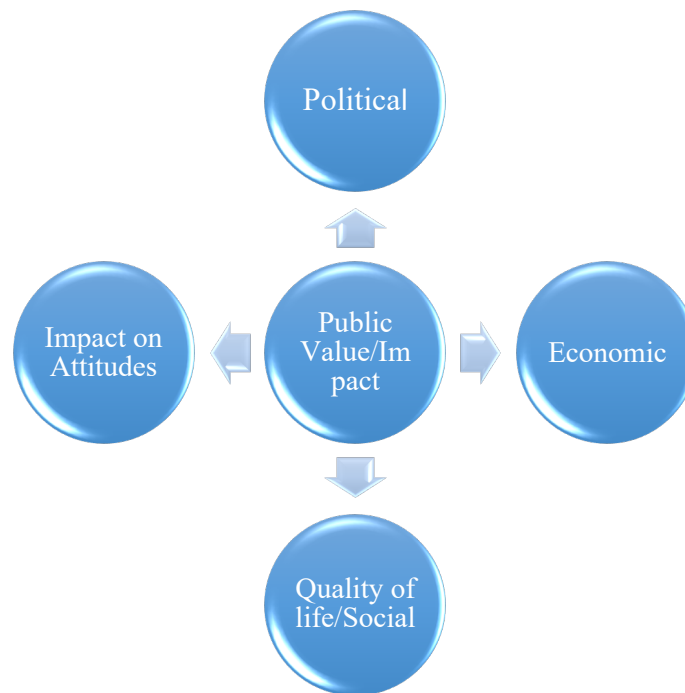
"The data hackathon we organized on revamping the open data portal. Several data-driven inventions were created. But we selected only three because we anticipated they we make the greatest impact. [...]" (Sabblah, 2019) [DU5].

The use of available datasets led to the creation of impact that was beneficial to citizens was considered a myth. DU did not always create the needed impact that their target population appreciated because it was challenging to know the exact needs of the population.

"We have written data-driven stories that did not make headlines, people; were just not interested" [DU5].

"We must know what citizens want with regards to data-driven projects and innovations. Otherwise, it will be a total waste of time. And as you know, interest and needs vary" [DU4].

7.5 Empirical Scene 3: Impact/Public Value



This section attempts to discover the impact of OGD use. The impact is sub-categorized into economic, quality of life, political, opinions, and moral impact. Each impact was analyzed from the perspective of beneficiaries (B), who included farmers, nursing mothers, and activists who were trained by DU. The beneficiaries were introduced to the researcher by the DU.

“The way we do things changed as a result of the inception of the OGD movement. We joined the movement so, what we do is to use the datasets available on agriculture to create technological solutions for farmers, mostly subsistence farmers. We have been able to cause a lot of changes in the agriculture” [DU6].

7.5.1 Impact of OGD Publication and Use

Despite the existing challenges that have influenced data publication and use in Ghana, empirical findings from the study revealed the existence of some impact that has been achieved. However, some controversy surrounding impact of OGD arose during the interviews. From the perception of DP, only DU were capable of creating impact. Although the quote below were from some DPs and PSs explained that DU were responsible for using available data to create impact. However, DU argued that the creation of impact depended on the published data, which was the responsibility of DP and PS. This was because the meaningful outcomes cannot be achieved unless published datasets are complete, understandable, current (frequently updated), and of good quality. Thus, the creation of outcomes was the responsibility of all stakeholders in the OGD ecosystem.

*“The creation of impact or as you [eerrmm...] put it, public value is beyond our jurisdiction. Ours is to make the data available, free, accessible, and reusable, which is very important. So, I think the public can benefit if other stakeholders within the ecosystem perform their duties. You know them [...] such as journalists, NGOs, etc.”
[DPI].*

“As far as we know using data after we have published is beyond what we do. We are supposed to make data available. The various users are then expected to take the datasets use it to help everyone and make meaning out of it” [PS 1].

7.5.2 Economic Impact

The economic outcome was realized through by improving the wealth and income of citizens/beneficiaries. This was attained through the use of data-motivated social interventions and mobile applications. The attainment of economic outcomes in Ghana appeared to be restricted to agriculture-related activities. Some of the interview participants disclosed that economic impact of using OGD was attained from famers’ perspective. DU focused on using available datasets on agriculture to help primarily farmers. Hence e-solutions were made available to farmers. These e-solutions provided them with up-to-date information on actual market prices for their produce, access to loan facilities through voice SMS, call centers which were made available on feature phones and information on weather conditions. Farmers’ knowledge of the actual prices of their produce enabled them to sell their produce at the right prices thereby ensuring wealth and income creation. A persisting challenge was the increase in produce wastage due to inability to sell farm produce at the right time. Consequently, although the e-solutions provided enabled the beneficiaries to create wealth through the provision of the right market prices and easy access to loan facilities, the e-solutions could not address the challenge of wastage and lack of storage facilities for the beneficiaries. The main challenge with the e-solution is its scalability.

“We can now easily sell or goods and not be afraid of being cheated on. We can also afford to save some money and get access to loans [...] you know. But there are times when we lose a lot due to waste. This happens mostly during peak seasons of farm produce [B2-famer].

“Data is being used to make 1,200 farmers in the Upper West, Bono, and Bono East regions more resilient to climate change. Farmers were provided with accurately processed and timely data on climate through the use of voice SMS in local languages and call centers. This was achieved through a collaboration between the Global



Partnership for Sustainable Data, Esoko, Ghana Statistical Service, National Disaster Management Organization (NADMO, and Ministry of Finance (MoFA) (Esoko, 2019)”.

Data was again collected to measure the actual impact of providing farmers with processed and data. The impact was measured based on their knowledge and how resilient they have been to climate change. Using available data to initiate a social intervention and gathering data after implementation of a social intervention is essential for developing and attaining the Sustainable Development Goals (SGDs). To ensure how the data-driven call centers and voice SMEs on climate change impacted on the economic life of selected farmer's data was gathered from 600 farmers. The results showed that the farmers had seen significant changes in productivity and adaption to climate change.

“To measure the impact at the end of the project, Esoko surveyed 600 farmers based on their demographics, adaption to climate change and productivity. A quarterly telephone survey was conducted to measure how the farmers used the information provided them. Data gathered during the project was sent to GSS for further analysis based on the SGD (Esoko, 2019)”.

Aside from creating economic outcomes through the use of data on agriculture, new branches of knowledge, and jobs such as data scientists, data journalists and data analysts have been created. Individuals who fell into these categories have increased their privileges as contributors to relevant issues in the country with the aid of published government data. The knowledge and skill possessed by these individuals have created a form of economic outcome for themselves through job creation or job enhancement. Although this new job specification demands new knowledge and skill, it has thus far created a form of income and wealth generation for those who fall within that category. For instance, the role and activities of data journalists in Ghana have increased. Their actions can be linked with the exposure of corruption through the use of data visualization tools, facts, and figures to back claims in newsroom reports.

“An integrated, cross- platform, data journalism had arrived in Ghana. The first major data journalism project in Ghana [...] 500 people talked about their experiences with government corruption via a mobile pool in for languages [...] (Journalism for Human Rights, 2013)”.

7.5.3 Quality of Life (Social) Impact

From the perspective of the interview participants, an improvement in the life of citizens should be considered as an impact created by OGD use. Quality of life was also understood to be partially dependent on the economic outcome. The quality of life of citizens was understood from the perspective of the general wellbeing of beneficiaries. General safety was categorized from the standpoints of family and individual health, gratification and safety. This outcome affected only a cross-section of the citizens. For example, improved quality of life of rural stakeholder farmers was due to their ability to use features of the e-solution to support their farming activities. A change in the economic standard of living of farmers could afford to ensure that the well-being of their household and themselves was improved. They could now sell their farm produce at the right prices due to foreknowledge of pricing obtained by using the existing e-solutions. This was emphasized by a couple who were both into small scale farming:

“We can now afford better things like food, clothing and educate our children. People don’t cheat us anymore; we know the prices, so we are able to negotiate the prices to our benefit” [B4].

The reason why we collected additional data, as you said after the project on farmers’ resilience to climate change, was to see specific goals of the SGDs have been attained and if the lives of the selected farmers have been improved upon. We realized there are far better with the customized knowledge on climate than before” [DU5].

Through published government datasets on social issues such gender-related violence, domestic violence, child mortality, and child labor, significant gaps have been uncovered by DU. For example, use of available of datasets on child labor contradicted the view that female children were more susceptible to child labour. Consequently, an impact was created by data journalists and DU5 on child labor. The use of regional datasets revealed that in male children were more exposed to child labour than female children in fishing communities specifically. In the fishing communities’ male children were expected to help in fishing activities. Previous knowledge on child labour placed the female child more exposed than the male child. DU explained that this though assertion was correct was based on national data with little focus on region-specific data. This finding led to development of interventionists programs at the regional and community levels focused on rescuing affected children and rehabilitating them.

Also, the use of available datasets showed that the simple cause for the high rate of child mortality in the three regions was inadequate breastfeeding and the delays expectant mothers

were subjected to when they were in labour. Follow-up enquiry revealed that, most women in these districts acted as considered as bread winners of their families. This affected breastfeeding as the women did not have much time to breastfeed after childbirth. In addition, there was inadequate knowledge on the importance of breastfeeding among women in these three districts. The quality of life of infants has been improved due to the intervention.

“After a year of that program, I can tell you that we have seen good results. They now breastfeed their children” [DP 2].

“[...] the aim is to help equip neonatal intensive care units of health facilities across the country with incubators” (Duodo, 2019).

7.5.4 Political Impact

DU have capitalized on the OGD movement to influence government decisions and policies through criticisms and commendations where necessary. For example, data journalists through the use of available government data on parliamentary attendance by members of parliament raised critical issues surround the high rate of absenteeism. The high level of absenteeism led to a serious nationwide debate on the influence of parliamentary attendance on the performance of members of parliament. Parliamentarians’ absenteeism and performance of was used as bases to critique government activities at the parliamentary, national and individual level. This criterion of structured critique supported data that drove citizens to demand better services from their parliamentarians. The reports of DS4, 8 has led to a change in attendance of ministers to parliament and also increased their level of interaction.

“It has been a perennial problem, and we may have to look at the processes and people that we take to parliament. It appears to me in Ghana we don’t have career politicians so called. We seem to have businessmen who get to a certain point and see coming to parliament as the way to self- actualization and not necessarily do the work. So, we must even look at the grooming process” (Marfo, 2018) .

“The aim of the Report on the Sixth Parliament is to fill the gap in this area by 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” (Odekro, 2016).

“A member of parliament needs to be regularly present parliament for the effective representation of the interests of their constituents and to participate in parliamentary business [...]. We are concerned



about the large number of ministers and ministers designate who are parliamentary leaders.” (Odekro, 2015).

The OGD movement also enabled several DU or intermediaries to put pressure on the government to change the dynamics surrounding Right to Information (RTI) by passing the bill into law. The non-passage of the RTI bill into law in Ghana into law after several years of the bill being considered at the parliamentary level. The intermediaries critiqued the government for failure of passing the RTI law and demanded up-to-date publication of government data, improve quality and a quick passage and implementation of the RTI. The RTI bill was passed into law in 2019. Several stakeholder workshops were subsequently held to figure out the roadmap to effective and efficient implementation of the law (Ibrahim, 2019).

A more recent development is the influence of a civil activist and pressure group called “Occupy Ghana” and their challenge of the authenticity of the quality of data published on to the Covid-19 cases in the Country. The challenge of the authenticity of the published Covid-19 cases was focused on the figures on death cases in the country. The bases of this were established based on the inconsistency in regional reports accumulated and reported at the national level. The pressure group explained in the following statement:

“There is a cause to suspect that the death numbers are being massaged. The reported 54 deaths so far cannot be right. For instance, even though 38 deaths have been reported from the Ashanti Region alone, less than 20 of those deaths are included in the national count” (Graphic.com.gh, 2020).

Thus, through published data DU were equipped with the power to influence the government activities and decisions. This led to an increase in public demand for accountability and transparency in government activities. However, these were only made possible when government data was available. Citizens could freely and constructively assess and monitor government performance.



7.5.5 Impact on Attitudes

Publishing, using and reusing of OGD influence citizens' opinions and ethical obligations towards themselves and the state. In addition, the use and reuse of published data led to the changes in some socially constructed misconceptions that had been held as actual beliefs. For example, some beliefs about gender and child labour, poverty, and child mortality were revisited as a result of OGD use and reuse.

The use and reuse of published data on census and standards of living by intermediaries (DU) uncovered different poverty patterns in Ghana that defied previously held opinions and beliefs. For example, data journalist with the aid of published data discovered the existence of communities in the Greater Accra Region whose living standard was lower than communities in Northern Ghana who were previously believed to be poorer.

"[...] the journalist [he] took the data we published on census and living standards and discovered that Greater Accra had communities that were poorer than some communities in the Northern part of Ghana. We used to think communities in the Northern Region were poor. But this belief has changed now, so have social interventions" [DU1].

7.5.6 Summary

This chapter presented a detailed report on the empirical findings. Writing a detailed report is the final stage of thematic analysis (Braun & Clarke, 2006a). The chapter also applied specific principles from (Klein & Myers, 1999b). The report on the empirical findings is structured into three empirical scenes. The first empirical scene reported the findings and analysis of social factors that enabled and inhibited OGD in Ghana publication. The factors included broadly data ownership, data quality, regulatory concerns, data sharing culture, control, and resources. Empirical scene two presented the social factors that enabled and inhibited OGD use in Ghana. The social factors were broadly divided into network/alliances, network power, resources, informal networks, data quality assessment, and myths of data use. The empirical scene three presented the impact of OGD use in Ghana. The impact was categorized into economic, quality of life, political, and attitudes. Sample quotes are added to support the narratives.

CHAPTER 8: DISCUSSION – THEORETICAL INTERPRETATION

8.1 Introduction

This chapter presents a discussion of the findings presented in the previous two chapters. The empirical findings identified in the previous chapter demonstrated the existence of social enablers and constraints and how they influenced OGD publication and use. This chapter provides the theoretical explanation related to the social factors identified and explained in the previous chapter. The discussion is structured based on the primary constructs of the Structuration Theory and the Public Value Framework. The chapter is sub-sectioned based on the structure of signification, structure of domination or power, structure of legitimation, economic impact, political impact, social impact, and impact on attitudes based on the Public Value Framework.

The researcher applied the principles of analyzing interpretivist research (Klein & Myers, 1999). For example, “the principle of abstraction and generalization” and “the principle of dialogical reasoning”. The empirical findings such as data ownership, network creation, data sharing culture and data quality that were unearthed in chapters six and seven were discussed through the lens of the Structuration Theory and Public Value Framework. For additional categorization and explanation of the themes, the researcher also used Honoré’s (1961) and Castells’ (2011) categorization of data ownership and network power, respectively. Based on the empirical findings, the first level of iteration occurred when the initial theoretical framework was changed due to theoretical biases governing the empirical findings and the study design.

The chapter attempts to provide empirically grounded, but theoretically conformant explanations to the propositions and also theoretically respond to the research questions:

1. What are the socially created patterns and behaviors that influence OGD publication and use in Ghana?
2. How does these socially created patterns and behaviors constrain and enable OGD publication and use in Ghana?
3. What are the public values created as a result of OGD publication and use in Ghana?

8.2 Theoretical Particularization

The table below provides a summary of some of the themes in the Structuration Theory that guided the theoretical elaboration.

Table 23: Theoretical Interpretation and Particularization

Construct	Propositions	Particularization
Agency	They are also referred to as human, social actors, individuals, or people. Giddens’ assumed and recognized the knowledgeable ability of actors within the social system. Agency also	The social actors involved in this study include members of data teams (data analysts, data enthusiasts, economic analysts and data scientists) or

Construct	Propositions	Particularization
	determines acceptable and unacceptable behavior within a structure plus its accompanying rewards or sanction. Actions of actors are replicated recursively.	intermediaries DU, DP, PS, and beneficiaries. These actors were experienced and knowledgeable in OGD related issues. Consequently, they formed data teams or data communities that enabled them to discuss acceptable and unacceptable OGD practices. For example, data quality assessment and access to data.
Structures	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 (Giddens, 1984).	Activities in the OGD ecosystem may be attributed to all the processes, actions, various types of networks, actors, and actors involved in the accumulation, publication, use, and impact of OGD. Therefore, the maintenance of the OGD ecosystem is dependent on the actors, rules, and resources.
Structuration	It pertains to how meanings are produced and reproduced over time by actors in the social system.	For example, actors created and recreated different meanings surrounding data quality and data ownership over time. The meaning attached to data ownership was that it belongs to citizens thus, there was no need to control it. PS saw data a ‘property’ either government or their respective institutions. The creation and re-creation of the meaning attached to data ownership influenced both data publication and use.
Domination, power	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> (Giddens, 1984).	Actors within the OGD ecosystem exercise domination or power through the uneven possession and use of <i>allocative</i> and <i>authoritative</i> resources. For example, the DU and DP had essential capabilities (e.g., technological and data analytical

Construct	Propositions	Particularization
		skills) that enabled them to control the OGD ecosystem in Ghana. Though PS had some capabilities, DU and DP possessed more of the same capabilities than PS.
Resources and rules	Resources were categorized as <i>allocative</i> (tangible) and <i>authoritative</i> (intangible actors' ability to control other actors within a social system). Thus <i>rules</i> and resources <i>coexist</i> ; they are embedded, exist, and guide the actions of individuals (Fuchs, 2003; Giddens, 1984).	Actors saw data as a resource that accessibility needed to be controlled. These were like the Data Protection Act and the Right to Information Act which governed the OGD ecosystem.
Modalities	Modalities concerns how people use rules and resources during an interaction, this is done knowledgeably manner. Also, daily social interaction consists of meaning, power, and norms.	The activities and interactions of data teams and data communities are based on their knowledge in OGD, skills, and technological resources at their disposal. Unwritten but meaningful norms guided the interaction for addressing the challenges of data quality.
Communication	Individuals within a structure communicate based on commonly acceptable schemes. Individuals are conscious schemes as they are part of the structure of signification (rules based on which meanings are produced).	Actors created networks purposely to get access to government data, exposure, funding, and determine the quality of datasets. Communication was vital in these networks.
Legitimation	Norms are part of the legitimation structure that allows sanctions to be evolved if not adhered to. Actors within the social system were aware of such norms and the sanctions.	There are norms that guide the data cycle that requires adherence. But sanctions in this context were symbolic rather than formal sanctions. PS were supposed to provide the DP with data that will be published on the approved data portals. So, even though not all PS were willing to give their data to the DP, symbolic rather formal sanctions have been given.

Construct	Propositions	Particularization
Duality of Structures	It entails the dynamic co-existence between structures or social practices and actors.	OGD publication, use, and value creation are dependent on constant interactions between practices and actors in the ecosystem. For example, interactions between members of data teams and data communities.

8.3 Theoretical Interpretation

The sections below present a discussion of the analyzed empirical findings from the main lens of Giddens' Structuration Theory. The Structuration Theory was applied to the first two research questions, while the Public Value Framework was applied to the empirical findings that answered the third research question. The first figure shows the general code distribution. The second figure below shows the axial codes for one of the empirical themes based on the Structuration Theory.

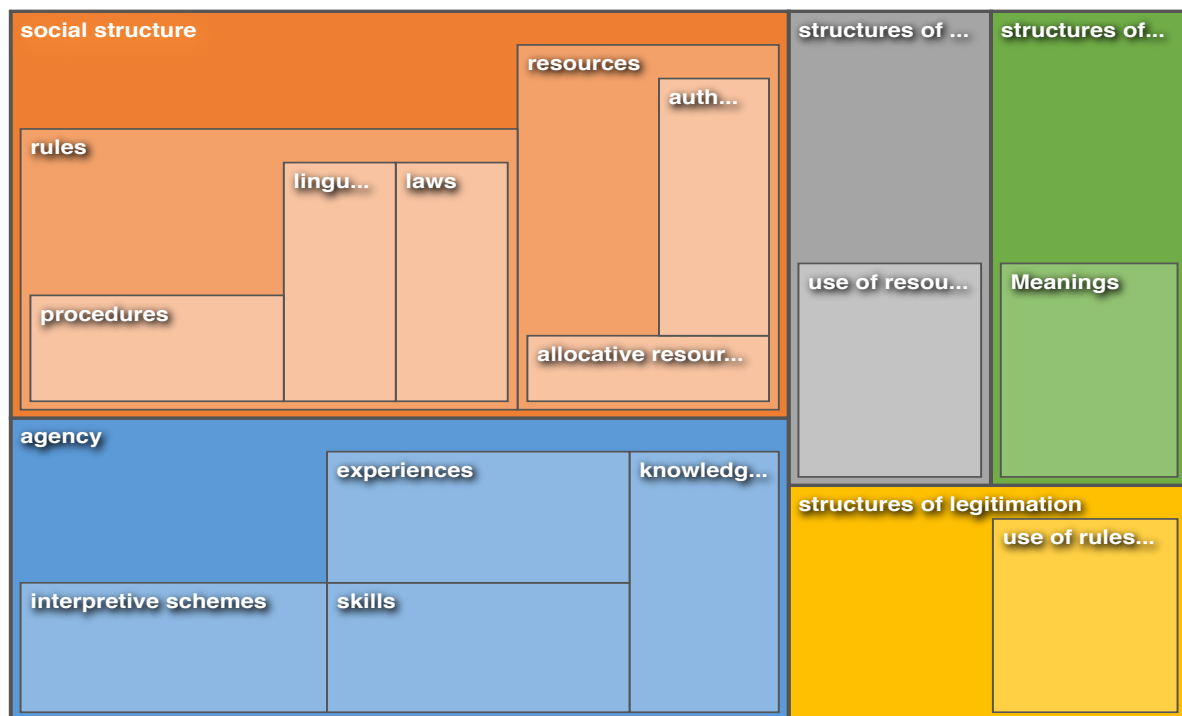


Figure 16: Code Distribution via the Process of Deduction

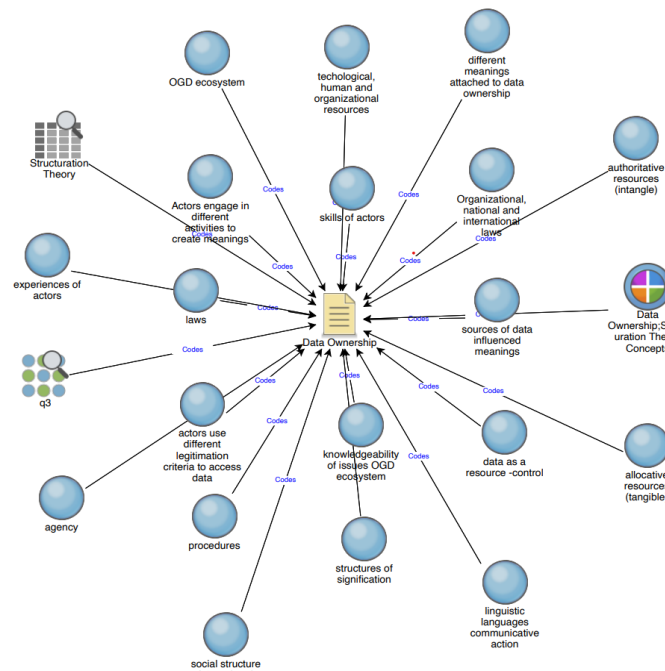


Figure 17: Distribution of Codes occurrences

8.4 Outline of Theoretical Discussion

The sections below attempt to analyze and explain the empirical findings from the lens of the primary constructs in the Structuration Theory. The Structuration Theory was used to analyze the first two empirical scenes identified in the previous chapter. Additional categorization of the identified themes was provided using explanations (Castells, 2011; Honoré, 1961). Finally, the Public Value Framework (Harrison et al., 2012) was used to provide additional theoretical explanation and categorization for the third empirical scene (impact of OGD).

Based on the division of the previous chapter into three (3) empirical scenes, the next section provides a discussion of the practices and behaviors that constrained the publication and use of OGD in Ghana from the lens of the structures of signification, domination, and legitimation. The sub-themes discussed under the section included data ownership, data sharing culture, data quality, human resource, legislative mandate, and institutional norms all these themes were discussed from the perspectives of the structures of signification, legitimation, and domination. This is followed by a section on the practices and behaviors that enabled OGD institutionalization of OGD in Ghana. The sub-themes discussed included network/alliance, technological resources, data sharing, myths of data use, network power and legislative mandate. This is followed by a section on the impact or outcome of OGD use from the perspective of the public value framework. The summary of the chapter is then presented.



8.5 Actors Perceptions and Assumptions on Social Constraints of OGD Publication and Use from the Lens of Structures of Signification

Actors in the OGD ecosystem had over time created and maintained structures, assumptions, perceptions, and behaviors that have inhibited OGD publication and use. This can be linked to the structures of signification. Through the structures of signification, meanings and understanding were repeatedly shared by actors, which has developed into inhibiting factors to OGD publication and use in Ghana. Actors engaged in interactions and social activities that directly and indirectly inhibited OGD publication and use in Ghana. Actors in a social system interacted and understood each other through interpretive schemes that are mutually shared and understood. Acceptable and unacceptable social behavior are communicated among actors. Also, knowledge was shared by actors during interactions pertaining to OGD activities. The knowledge of actors in the OGD ecosystem was rated based on their symbolic capital, experiences, and capabilities. Actors' ability to understand, interpret, publish and use data was crucial.

From the perspective of Structuration Theory, meanings are produced and reproduced over time by actors in a social system (Giddens, 1979; Ogden & Rose, 2005). Through the Structure of Signification, which is epitomized by interpretive schemes, actors in a social system communicate, interact and share mutually agreed meanings (Jeremy Rose & Jones, 2005; Schultze & Orlikowski, 2004). Sharing of knowledge, rules, and the use of resources are key when actors interact in when actors' interact in a social system (Buhr, 2002;Orlikowski, 1992). Hence Organizational rules and resources guide the interaction and communication between actors.

8.5.1 Data Ownership through Structures of Signification

The meanings and assumptions that actors' (PS, DP) ascribed to data were ownership, that is, perceptions of an individual or institutional ownership. Though data was expected to be made technically available due to the rules on legal openness of data, actors' perceptions and assumptions on data ownership and institutional structures inhibited its technical availability. Data owners created and recreated the perceptions and assumptions surrounding data ownership. This over time became part of the institutional structures, misconception about losing data once it was made technically available. And routine activities with regards to technical openness and access to accumulated data was limited. The perceptions included misconceptions surrounding who actually owned data, perception of single institutional

ownership of data due to resources used in the accumulation, process and storage of data and assumption of individual ownership due to their role in the organization. Therefore, it was expected that the actor's ideology on right to access data was structured into controlling both data use and re-use. The roles actors' occupied in the OGD ecosystem has an influence on the complexities surrounding data ownership (Van Alstyne et al., 1995). 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 (de Beer, 2017; Mashhadi et al., 2014).

Meanings and perceptions of the data complexities were communicated and understood by actors in the OGD ecosystem. The main complexity surrounding data ownership pertains to ascribing a contextualized meaning to ownership as title and control to either an institution, central government, or citizens. These meanings were *interpretive schemes* created, communicated, and shared among PS with regard to data in a social context. Interactions between actors in social systems lead to the use of already established knowledge, resources and norms that creates the *structures of signification* (Orlikowski & Robey, 1991). The use of manual and unintegrated systems constituted institutional structures that were produced and reproduced despite the implementation of e-government initiatives. The unintegrated and manual systems became *interpretive schemes* acceptable within the social structure. Within the context of OGD in Ghana, actors through *interpretive schemes* were able to understand and interpret the perception and assumptions of data ownership as an inhibiting factor to data publication. For example, through interaction DU were able to explain why institutional data was not readily available and devised new ways to access data despite the challenge with data ownership. Other actors, however, interpreted data ownership as a necessary requirement to remain relevant.

This provides empirical evidence why the OGD web portal had to undergo a revamping exercise. There was a collaborative exercise between DU, DP, and PS focused on uploading data on the approved portal. It provided an atmosphere where the different actors in the OGD ecosystem could communicate and share meanings via the same *linguistic language* in the same social structure. This shows the existence of *duality of structures* in a social system (Giddens, 1979;1984) with evidence of a reciprocated interaction between social actors and social action. Actors' behavior towards data ownership inhibited OGD publication which affected its institutionalization and influenced the complexities of data access. Through the behavior and

assumptions exhibited concerning data ownership, actors created and re-created the structures of signification which inhibited OGD publication and its subsequent use in Ghana.

8.5.2 Data Quality through the Lens of Structures of Signification

The meanings and understandings actors in the OGD ecosystem ascribed to data quality were related to the institutional scientific methodologies. Due to the existence of different institutional scientific methods, it was challenging for DP and PS to mutually communicate and agree on a unified scientific methodology to guide the data life cycle. The understanding communicated among DP and PS was that the institutional scientific methods were essential due to the data each institution had. Thus they did not need a common one. Despite using different institutional scientific methodologies, data quality was still a significant constraint to OGD publication and use. The challenges in scientific and methodological consistency used in the data life cycle, including the accumulation, processing, storage, and dissemination can be linked with data quality challenges in developing countries (Verhulst & Young, 2017). Since quality data is determined by the readiness of data to be used (Juran & Godfrey, 1999), data availability may not necessarily mean that data is usable. The formation of data communities and teams to address and determine quality challenges came at a cost. The DU identified in these study regards data as core to their activities. Hence, a good quality data was a necessity. Notwithstanding the challenges associated with data quality that has inhibited OGD publication and use in Ghana, it is important to note that data interpretation and understandability are based on the core values of DU and available organizational resources (Ferro & Osella, 2013; Vetrò et al., 2016).

Actors in the OGD ecosystem were knowledgeable in data quality issues and what constituted quality data. They had learned with time, through experiences, and as part of their routine activities the ability to comprehend data quality challenges and their negative influence on OGD publication, use, and impact. With this knowledge earned through experiences, could address data quality challenges through both technological (software) and non-technological means (skills and experiences). Through communication actors created and recreated prevailing structures of signification related to data quality that inhibited OGD institutionalization in Ghana. The use of technology throughout the data life cycle exhibits the importance the socio-technical nature of OGD and actors' ability to determine if data was of the right quality to be published and used. Data quality was also used as a motivation for the DP to justify and maintain control (ownership) of the process, that is, data and data publication

monopoly as part of ‘data ownership’ then institutionalized as a structure of domination and legitimation.

8.5.3 Data Sharing Culture through the Lens Structures of Signification

Actors and institutions created and re-created patterns and behaviors that reduced their tendency to share data. The patterns and behaviors produced and re-produced meanings, assumptions, and perceptions related to actors and institutions’ unwillingness to share stored data. The meanings actors and institutions attached to data sharing were unwillingness to share data and the need to stay relevant. This knowledge was continuously communicated through interactions which align with the *interpretive scheme* as explained in Structuration Theory. Through the structures of signification, organizational interaction and the rules that govern the interaction are communicated and defined (Giddens, 1984). Actors’ unwillingness to share data was caused by averseness, which resulted in creating bureaucratic structures. In contrast, the unwillingness of institutions to share data was ascribed to the mutually agreed and shared organizational culture and technological environment (unintegrated systems and scattered nature of available data). However, recent trends showed a different practice and behavioral pattern springing forth that may address institutional unwillingness to share data. This new trend in the OGD space in Ghana involved inter-organizational (public-private sector partnership) data sharing and use. This was due to mutual knowledge and understanding of actors on the importance of data sharing transcending beyond institutions to citizens. Institutional actors consistently engaged practices and exhibited behaviors. These behaviours were exhibited through linguistic actions which created and recreated existing structures of signification that related to the tendency of actors and institutions unwillingness to share data and thus contribute to the institutionalization of OGD in Ghana.

8.6 Social Constraints of OGD Publication from the Lens of Structures of Domination

The discussion in this section is focused on linking the empirical findings based on the identified themes to the structure of domination. The structures of domination are created and recreated over time through the control of resources in the social system. These are structured resources of the social system, which they become underlying factors for the attainment of power or domination. In a social system, power/domination is attained through resources that lead to the creation and re-creation of the structures of domination. Hence human agents through the use of allocative and authoritative resources, have the capability of exerting power.



Allocative resources are obtained via the control over material products or resources, while authoritative resources are obtained through the control over activities of other actors in the social system (Giddens, 1984; Jones & Karster, 2008). Power or domination is evident in the social system due to the limited availability of resources in the social system and the quest to control these limited resources by social agents (Giddens, 1984; Jones & Karster, 2008). Hence, the section presents how actors in the OGD ecosystem, through interactions, relied on the control of resources to acquire power that was capable of influencing and inhibiting OGD publication and use and thereby creating and re-creating the structures of domination. Data, technological resources, and human resources were the resources that were presented in this study as inhibitors to OGD publication and use.

8.6.1 Data Ownership (*data as a resource*) as Structures of Domination Created and Re-created Over Time by OGD Actors

Data ownership through the lens of the structure of domination related to social agents' ability to control material resources and exercise power relations within the social system. Although actors in the OGD ecosystem expected data to be readily available for publication, use, and create public value, the meaning attached to data as a resource led to the practice and behavior of controlling accumulated data. Data was seen as a scarce resource that needed to be controlled to portray their power or domination over others. Social agents' ability to control material resources and exercise power relations within the social system via the use of resources constitutes the structure of domination (Giddens, 1984; Ogden & Rose, 2005). The assumptions and perceptions associated with data as a source of power, therefore to the need to exercise control existed at both the individual and institutional levels; this was attained through personalization of data by both individual actors and institutions. Activities such as data publication, use, and creation of impact in the OGD ecosystem were carried out by actors by drawing on data (resource). Through the control of data, both actors and institutions acquire power which enabled them to maintain old ways of accomplishing performing activities/takes and continuously remain relevant and in control. By continuously acquiring and maintaining this power/domination and suing it during interactions with other actors, the process of legitimation is being institutionalized and thus not only contributing to the creation and recreation of the structures of domination but also inhibiting OGD publication and use. The perception and assumption attached to data as a source of power and a resource in the OGD ecosystem have been created and recreated over time by actors. The perception and behaviors



of actors are created and re-created over time and accepted as part of social action and social structure (Dow, 1988; Willmott, 1981).

Though Callon (1999) argued about the need to focus on the effects of power (which trigger actions and changes), it is important to identify the sources as it may help in the adequate understanding of its effects. Thus to Callon, power is a combination of ‘effects’ that can be traced and not a source that is only triggered by the mental intentions of humans. The current study exposes the importance of understanding the sources and effects of power in social systems. For example, organizational actors saw data as a resource and a source of power that gave them domination over other actors. Human actors’ perception of data as a resource and subsequently a source of power produced effects like control and non-sharing of data. Actors’ perception of data was that of an organizational or individual ‘property’ which needed to be controlled.

Blending the Giddens’ ST with Honoré’s (1961) ownership can be further explained. From the findings, DP and PS 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 an 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 (1961) explained that the perception of ownership gives actors three rights: usage rights, controlling usage rights, and continuously remaining in control. From the findings, actors assumed ascribed meanings like individual and institutional personalization to data which led to the perception of the right to use, control and continuously be in control of data use. Consequently, such actors reserved the right to determine when data could be released.

8.6.2 Technological Infrastructure as Structures of Domination that is Created and Recreated over time

Access, availability, and ability to use technology was a recently added routine resources that actors perceived as essential in the OGD ecosystem. Technological infrastructure was considered a resource that demanded for additional resources such as skills, qualifications, and financial aid. These additional resources were not readily available to some institutions and individuals in the OGD ecosystem. Though the use of technology became a pivot that drove the OGD agenda to some social actors and institutions, it was considered a hindrance because of the uneven distribution of this resource in the OGD ecosystem. Actors perceived and assumed that the inclusion of technology in the data life cycle resulted in a shift in the power



dynamics that had been normalized. The *structure of domination* is present in society through the uneven distribution of resources (Giddens, 1984; Rose, 1998). The *structure of domination* is further endorsed when actors use these unevenly distributed resources during interactions. Therefore, social actors and institutions who lacked the required skills, knowledge, and infrastructure to harness the new development felt powerless. This created the perception and assumption that their control and power was being taken from them and given to other actors and institutions, which resulted in the practice of not releasing data to the recommended institutions for publication. Actors and institutions who possessed the required skills, knowledge, and additional resources were considered to have power over those who did not have. Due to this, there was a power shift that has been attributed to technology and its related infrastructure; new rules and unwritten norms were enacted as a result of OGD publication and use. These rules and norms ‘privileged’ actors and institutions with access to the required resources, making technological infrastructure a source of power or dominion determining who published and used data.

The inclusion of technology influenced every stage of the data life cycle. This made it essential for actors who could push the OGD agenda to be equipped with power that enabled them to change the OGD ecosystem. This resulted in a new practice where a single approved data web portal became a common tool for communicating and sharing data accumulated by all government institutions. Which was intended to ensure transparency and equip citizens and other organizations with the ability to access and use government data to create value. This new practice is yet to be normalized and has influenced the complete institutionalization of OGD in Ghana. Using the web portal as the main medium for communicating and sharing data led to a power shift, where power now belonged to actors who were knowledgeable and capable of producing results based on either data publication or use. Through *dialectic control*, actors can engage in activities that may lead to the modification of the structures of domination (Giddens, 1984). Before introducing a common web portal to promote the OGD agenda, the perception of actors on access to and use of data was centered on institutional contextualization and understanding based on governing rules and norms.

8.6.3 Human Resource as Structures of Domination Created and Recreated Over Time

Actors perceived acquired knowledge, skills, experiences, and symbolic capital as essential resources that, when unevenly distributed during interaction in the OGD ecosystem, may inhibit OGD publication and use. Due to the importance of these human related resources in



the publication and use of OGD, the capacity of actors to possess or not to possess them created and recreated the *structures of domination* which in some cases inhibited the publication and of OGD in Ghana. Acquiring the symbolic capital, knowledge, and skills set needed by actors to enable them to function effectively and efficiently in the OGD system had financial implications. The knowledgeability and reflexivity of actors are essential during interaction and creation and re-creating of routine activities (Rose & Hackney, 2002; Walsham & Han, 1991). For example, evidence from the findings indicated that DU were skilled data analysts and possessed the technical skills that were capable of enabling them to harness the potential of published data for public benefit; some actors in PS were equally skilled. Though with these resources, DU were capable of using data, data use was dependent on its availability. However, data availability was inhibited by inadequate possession of these resources. By possessing the needed skills, experiences, and symbolic capital, actors were able to (1) collect and synthesize quality data, (2) effectively interact and communicate with other shareholders in the OGD ecosystem, (3) analyze and use data for the public good, (4) identify good quality data. The uneven distribution of these resources among actors was a contributing factor that has inhibited the institutionalization of OGD in Ghana.

8.7 Social Constraints of OGD Publication and Use from the Lens of Structures of Legitimation

This section presents a discussion on how behaviours and practices were interpreted at the actors and institutional levels. How they become institutionalized as legitimate or illegitimate actions, right or wrong and the rewards or sanctions that follow them. And how they inhibit OGD publication and use. The perceptions that underly the structures of legitimation include rules are procedures that guide actor's social action. How they are sustained and expressed through social practices. How they produce some form of legitimation criteria, that is, sanctions or rewards. How they are implemented when actors in a social context either abide by do not to abide by shared rules and norms. They provide actors in a specific context the appropriate procedures and means to make resources and rules usable (Jones & Karsten, 2008; Rose & Jones, 2005). These institutionalized rules, sanctions/rewards and norms create and recreated the legitimation structures. Empirical evidence from the research findings revealed the existence of institutional norms and how the norms have been institutionalized, which are created and recreated over time by organizations organizational actors. Specific norms were created by actors that established both institutional and individual control or personalization of data. Whiles the norms were established and legitimized by institutional actors, rules were



formally legitimized at the national and institutional levels. The rules provided guidelines that governed OGD, while the contextual norms established by actors included bureaucratic structures, fear, perceptions data complexities, institutional culture, and data personalization. Through the practice of using these rules and norms in daily activities, actors were strengthening the recreation of the structures of legitimation (Lyytinen & Ngwenyama, 1992; Rose & Lewis, 2001).

8.7.1 Legislative Mandate as Structures of Legitimation Created and Re-created Over Time

The empirical findings suggested that rules that guided OGD were national and institutional. These rules provided a legitimation criterion for actors regarding data publication, use, and its institutionalization in Ghana. The rules were a source of *authoritative resource* for DP; that is, they had the *power* to control other actors in the multi-stakeholder OGD ecosystem. The power was thus legitimized through formal rules. Rules are procedures that guide an actor's social action, and this produces some form of legitimation criteria (Rose & Jones, 2005; Walsham & Han, 1991). During social interaction, actors use either material (allocative) or non-material (authoritative) resources. The power that came with access to authoritative resources enabled the agents to control the data published on the approved data portal. The rules helped actors to formally interpret and communicate the practice of institutionalizing data through publication and use. Through shared understanding and practicalizing the rules that governed OGD, actors in the OGD ecosystem were knowingly creating and recreating the structures of legitimation through enacted formal rules. Despite the existence of rules intended to institutionalize OGD in Ghana, there were factors that caused the rules to become constraints. Factors that made the legislative mandate constraints to the institutionalization of OGD in Ghana included (i) different institutional rules, (ii) delay in passing the RTI bill into law, (iii) challenges with the RTI implementation (iv) different/conflicting institutional laws. Though the rules supported the publication of data on a single approved web portal, the rule was not adhered to, and practical non-adherence attracted symbolic sanctions rather than formal or institutionalizes sanction. On the other hand, adherence did not practically attract any reward either. It was expected that through the institutionalization of OGD, government institutions would make data easily accessible technically. Thus the use of a single web portal would have been normalized, thereby ensuring that agents could access, understand, interpret, and use data to create impact. Though rules were normally accompanied by the required rewards or sanctions, in the OGD ecosystem, the rewards were not explicit and the sanctions were primarily symbolic



and normative. Supposing structures were created to spell out and implement sanctions or rewards based on the activities and practices related to data publication on the approved portal. In that case, this may lead to the recurring to the structures of domination.

Actors set up unwritten norms with the aim of controlling data access and publication. These rules were nationalized into the organizational structure and routine activities. The rules included implementing institutional bureaucratic regulations and structures that compelled both individuals and organizations to follow before getting access to data. These norms or bureaucratic structures were legitimized as the required procedure for data access. The perceptions and assumptions that actors held over data ownership created a legitimization criterion where institutional actors saw themselves as data controllers.

For actors to remain in control, different legitimization criteria were institutionalized to influence data access and publication. These legitimized and institutionalized rules included the bureaucratic processes that guided data access. The bureaucratic processes enabled actors to see data property and a right which was expressed in three ways: (1) right to control what is 'owned' in this case data, (2) right to use available data, and (3) right to remain in control of data without intrusion from other actors. These perceptions were in agreement with (Honoré, 1961) categorization. Hence these practices were intentionally and unintentionally implemented as bureaucratic structures that triggered actors to control data, thereby overlooking the rules that governed data publication in the era of openness.

8.7.2 Institutionalized Norms as Structures of Legitimation Created and Recreated Over time

There were particular institutional norms that actors had institutionalized before and after the introduction of OGD in Ghana; these norms included personalization and controlling data. Actors created recurrent perceptions and practices that resulted in the institutional and individual personalization of data which with time became an acceptable practice and norm. Government institutions that accumulated data and the individuals 'in charge' continuously attached the institutionalized normative standards, which were articulated as a necessary guidance and collective enigma of behavior for data access and use. PS1 *'If you want access to our data, it is required you go to the main source, and that is us'*. Although these practices hindered OGD publication and were expected to attract sanctions, they did not, as sanctions were yet to be institutionalized in the OGD ecosystem.



Consequently, controlling data was the an ensuing norm that actors used to legitimize authority over data access and use. By continuously adhering to the practice of institutional and individual personalization and control of data, actors were consciously and unconsciously creating and recreating the structures of legitimation that have, directly and indirectly, inhibited the institutionalization of OGD in Ghana. These continuous practices became acceptable behavior shared among the different stakeholders in the OGD ecosystem. The *structures of legitimation* are created when actors acknowledge acceptable and unacceptable behaviors in specific contexts (Giddens, 1984; Yates, 1997).

8.8 Social Enablers of OGD Publication and Use from the Lens of Structures of Signification

This section presents a discussion on the social enablers of OGD institutionalization in Ghana through the lens of the Structures of Signification, Structures of Domination, and Structures of Legitimation. The emergent themes from the findings that enabled the publication and use of OGD in Ghana include network/alliances, access and use technological resources, legislative mandate, and data sharing are presented in the following sub-sections from the lens of the structuration theory.

8.8.1 Network/Alliances as Structures of Signification Created and Recreated Over Time

The understanding actors attached to accessing and using data was through creating networks/alliances (both national and international). DU recognized that institutionalizing OGD in Ghana also required creating social connections/collaborations at the national, inter-organizational, and international levels. Through networks/alliances, actors have created and recreated the *meanings* based on mutual benefits (funds, access to easy/quick access to data), partnerships, and exposure. As a result diverse actors within the OGD ecosystem were able to communicate and determine the networks to join. (González-Zapata & Heeks, 2015). The knowledge of OGD actors was often associated with their skills and experiences in data related issues, which was a critical factor that contributed to the network/alliance that they joined and the mutual benefit that was accumulated over time. Such knowledge is evident in social groups that existed either within or between organizations (Tsai & Ghoshal, 1998).

These networks/alliances were also used as a platform to communicate and share knowledge on ensuring that available data was of good quality and could be used. Although data quality was a major challenge to OGD publication and use, actors' (DU) were equipped with the ability



to interpret, understand and use specific strategies (software and discussions among data communities and teams) to improve data quality before use. Actors through data communities and teams relied on a common linguistic skill (language), experiences, and allocative resources to interpret and understand datasets before use. Actors' ability to interpret and understand datasets was based on their knowledgeability of what constituted and the requirements of data quality. The activities of networks/alliances were guided by informal rules, unwritten norms and resources. Informal rules and unwritten norms that guide the social activity of actors in the data communities and data teams were based on requirements of data quality. These unwritten norms (individual or institutional) may contribute to data quality challenges (Verhulst & Young, 2017). These requirements were communicated and shared among actors in the data communities or teams and acquired through learning. The resources required included computers (preferably laptops), the internet, skills, and knowledge. The interaction between organizational actors' in a social system is guided by legitimized mutually acceptable norms and practices (Bonina & Eaton, 2020) as well as actor's knowledge. Consequently, actors in the OGD ecosystem were considered knowledgeable in issues surrounding OGD publication and use. Such knowledgeability was expressed either through tacit or explicit knowledge, which were acquired through experiences and skills.

Social and symbolic capital were critical *authoritative resources* used to determine data quality. This was achieved through the interactions and activities of data communities and teams. The symbolic capital of the actors in the network/alliances positioned them to possess expert knowledge and techniques in OGD, identifying data challenges and ways of addressing them. Resources are essential aspects (allocative and authoritative) of sharing meanings and understanding among social actors in a social system (Fuchs, 2003; Jeremy Rose, 1998). The allocative resources of the actors were acquired through symbolic capitals such as data analysts, data journalists, data scientists, and data enthusiasts. Knowledge gained through these symbolic capitals enabled the actors in the OGD ecosystem with unique capabilities and skills that were used to determine challenges with available data that affected its quality. The use of allocative resources in terms of the symbolic capital of actors was essential due to the tendency for data quality challenges to be traced from the start of the data life cycle. Through the creation of networks/alliances, already prevailing structures that pertained to OGD institutionalization have been created and recreated over time.



8.8.2 Technological Resources as Structures of Signification

The understanding and perception of actors towards technological resources as an enabler of OGD publication and use came from their knowledgeability and reliance on technology to access and use data. Although the uneven distribution of technological resources was mentioned as a constraint to OGD successful institutionalization, actor's knowledgeability of technological resources also served as an enabler of OGD publication and use. Actors in charge of the approved data web portal were technologically knowledgeable, which served as an enabler. As explained by DP2, *"we have adequate knowledge and skill set needed to publish and manage the data that we get from the other institutions, we were already handling all tech issues in the country so, we are good"*. The actors' knowledge and ability to use available technology enabled them to interact with other actors in the OGD ecosystem; through these, the actors are consciously and unconsciously either altering or strengthening *interpretive schemes* and endorsing rules of data publication or use. *Interpretive schemes* are either strengthened or changed, but rules are endorsed by organizational actors during interactions (Rose & Jones, 2005). Actors in the OGD ecosystem were able to communicate based on their knowledge in technology to map up rules that enabled them to provide acceptable and unacceptable interpretations to data quality before use. DU3 *"the team members in my organization are required to have technological knowledge, have skills and experiences with data, data analysis, data use, and sometimes even programing or coding skills. These are essential because our core mandate is to write stories and create impact by using available data."*

Actors' technological knowledge and the ability of organizations to provide the needed technological resources was one of the factors that enabled OGD institutionalization in Ghana. Hence as organizational actors relied on technological resources and their knowledgeability they created and recreated the structures of signification that enabled them use OGD to create impact/public value. Research has shown that resources, rules, technological capability, and awareness are important determinants successful OGD institutionalization (Zhao & Fan, 2021).

8.8.3 Data Sharing Culture as Structures of Significations Created and Re-created Over time

The empirical findings revealed the emergence of new collaborative dynamics in the OGD ecosystem that saw inter-organizational alliance targeted data sharing, which may be contributing to the institutionalization of OGD in Ghana. Actors in public and private sectors created *meanings and assumptions* ascribed to data sharing, including collaborative data



sharing and use based on acceptable and unacceptable behaviors and practices. The findings indicated that data sharing and use was based on the equal partnership between public and private organizations (national and or international). Data sharing was made possible through communication, interaction, and collaboration between actors who had the capacity and ability to endorse activities that lead to equal responsibilities in the partnership. The meanings and assumptions created were based on actors' knowledgeability and willingness to share and use data to perform specific tasks. Therefore, through collaborative data sharing and use, actors were able to accomplish the tasks of data use and the creation of impact. As intra-organizational collaboration on data sharing is gradually becoming a norm and a repetitive practice, the multiple actors in the OGD ecosystem contribute to the creation and recreation of the Structures of Signification. Actors created and recreated the structures of signification by relying on their knowledgeability and through the production of understanding and meaning associated with OGD institutionalization in Ghana. Through data sharing, the structures of signification are created over time. Positive data sharing culture is linked to the willingness of organizations to share data as well as having a culture that is centered on data (Alanazi & Chatfield, 2012; Ubaldi, 2013).

8.9 Network Power as Structures of Domination Created and Re-created Over Time

Organizational actors who belonged to networks (national, inter-organizational, and international) or formed alliances were knowledgeable in OGD use. OGD use enabled them to perform tasks that were directed at using data to create impact. The social interactions that actors in these networks/alliances engaged in often resulted in data use and impact creation which further led to the emergence of power among the actors in the network/alliance. The emergence of power is a result of the interactions among/between organizational actors (Rose & Jones, 2005). OGD actors could use the power they had created through social interactions, networks, and the knowledge they had acquired to either control the OGD ecosystem or make them relevant. Hence, through integrations among actors in the networks/alliances, these networks/alliances become the source power actors used to get access to funding and exposure and make impact through OGD use. By drawing on knowledge and interactions in networks/alliances, organizational actors in the OGD ecosystem were using OGD, which enabled them to tell impactful stories or develop data-centered solutions for targeted Ghanaians.

Power in alliances/networks can be explained from the perspective of Castells (2011) categorization of existing power in networks. Castells (2011) demonstrated that networks were not formed in a vacuum. As such, there exist evidence of power within these created networks. Although Castells categorized the power in networks into four, the findings and empirical elaborations from this study supported three of the categorizations. They are elaborated in the table below.

8.9.1 Table 24: Castells' Categorization and Evidence from Empirical Data

Castells' Categorization	Theoretical explanation	Evidence from Empirical Findings
Networking Power	The power emanates from global partnerships whereby actors included in such networks are considered to have power over those who do not belong.	At the global level, networks were created, valued, and perceived as sources and enablers of international exposure and power. This type was created between multi-national organizations and DU. Such alliances/networks were seen as a source of power and a legitimation criterion.
Network Power	It exists when power is exercised based on attachment to a network	DU also considered their ability to have access data that was not published through social interaction with other actors in the OGD ecosystem as an exercise of power.
Networked Power	It exists when actors perceive to have power over other actors within a social system which is defined by a particular network	In their capacity as 'owners of data,' actors in PS felt they had the power over other actors in the ecosystem. Also, DU, based on their networks with other actors thought they had power over other actors, because of the ability to use these networks to access data.
Network Making Power*	This power was exhibited when networks actors could change to different networks based on alliances formed with others.	There was no evidence in the empirical findings supporting this type of network that allowed actors to switch between networks due to alliances.

8.10 Impact of OGD Use

This section presents the theoretical discussion of the impact of OGD use in Ghana. This section is discussed through the lens of the Public Value Framework (Harrison et al., 2012) and literature that focuses on public value creation. The discussion is based on the potential and actual impact of OGD use in Ghana. The type of impact made depended on both data available for use and the focus or purpose of the DU organization.



8.10.1 Economic Impact

Generating economic impact/public value could be traced actors' ability to capitalize their knowledge, skills, and experiences with data to create or improve the income and wealth of citizens. DU used available datasets to create value targeted at improving the livelihood of farmers economically and started a new dimension of employment (data enthusiasts, data journalists, and data analysts). The economic impact was realized by using resources (like data and technology) by actors aimed at meeting the needs and demands of farmers and citizens. For example, the empirical data explained that improving the lives of farmers through the use of data was one of the intended outcomes or impact the OGD movement sought to achieve, that is transforming available data into workable solutions aimed at increasing the income and wealth of citizens. SMS and feature phones helped bridge the gap between farmers, markets and prices of products. Although the interventions (SMS, feature phones) were targeted at farmers, and their produce, they presented new opportunities for buyers and sellers to bargain at the right prices. Also, an unintended economic outcome that was related to the acquisition of specialized symbolic capital by actors in the OGD ecosystem was realized as a result of OGD use. OGD use created new economic value for DU identified as experts in assessing and use government data. Aside the recognition in the OGD ecosystem, these symbolic capitals that boosted the financial background of DU included data journalists, data enthusiast and data analysts.

The challenge identified with economic public value created via available datasets was limited to DU and farmers. The cause of this challenge was associated with the inadequate availability of datasets and the objective and scope of DU. DU were technology-based organizations that existed prior to the OGD movement. To this effect, their use of datasets was influenced by their prevailing objective. Thus, there existed resources and informal rules that determine the datasets that would create the most benefit. The impact created was also expected to be in-line with the objectives of DU or intermediaries. Although the informal rules were reviewed and resources were used to make room OGD use and reuse, the scope and objectives of DU remained a determinate of the dataset that were used and the outcome that was expected. ST assumes an existing relationship between social actors and society; this relationship is guided by rules and resources which are created and recreated over time (Benington, 2009). Thus government data use was also expected to develop the knowledge of actors as a public value (Janssen et al., 2012). The empirical findings from the study indicated that data communities and teams held discussions that were centered around data quality assessment; through such



discussion's knowledge were created and exchanged. Social actors are considered knowledgeable and use meanings to aid in communication within the social structure (Fuchs, 2003).

Economically, OGD can contribute to cost-saving opportunities for citizens public and private sectors. Making data available on a single portal can lead to cost savings in the health sector by identifying and positioning trained first aiders at hospitals and remote areas where access to health care facilities is challenging. One observed critical challenge Ghanaian's face was increased labor costs due to heavy road traffic. Potentially an economic impact can be created if current and historical data on road traffic is made available to data intermediaries to use. These data intermediaries can develop innovations that can help save labour costs. An example of a potential impact or value that could easily be created as a result of OGD use is related to the data on HIV in Ghana. By leveraging on the data public-private partnerships could be formed with a focus on developing innovations (such as drone delivery of medications) and interventions that are targeted at the most vulnerable group like women. The measurement of both potential and economic impact or public value in the era of openness is essential to its success (Harrison et al., 2012).

8.10.2 Social Impact

One of the expectations in the era of openness is to create extra value from free government datasets (Fuchs, 2003). The value created from published government data is expected to improve the lives of citizens. The improvement in citizens' quality of life was categorized by (Gebka, Clarinval, Simonofski, & Crusoe, 2019) as a possible outcome of OGD use and reuse. The quality of life of people is determined by an improvement in the total welfare of individuals as well as an enhancement in their health, security, and gratification at both collective and individual levels (Harrison et al., 2012). Thus, improvement in the quality of life of people is not built only on economic outcomes but other outcomes such as health, empowerment, and better nutrition. The activities of intermediaries in the OGD ecosystem have the capacity of improving the quality of life of citizens (Harrison et al., 2012).

The findings contained evidence of beneficiaries' ability to generate extra income that enabled them to afford social amenities that were previously (before the use of OGD) impossible. The value of OGD lies in creating value that targets meeting the needs of citizens (Gebka et al., 2019). Hence, a citizen's ability to meet essential needs that may improve their quality of life is a crucial outcome of OGD usage. As indicated in the findings, although the complexity



surrounding Data Ownership is yet to be addressed, citizens' data should have the ability to trigger quality of life for citizens. For example, the findings revealed the impact of inadequate nutritional information about specific crops that were solely grown by farmers as cash crops. However, additional research from DU helped farmers identify the cash crop's nutritional value. What the farmers needed was adequate communication and education on how the nutritional value of the cash crop could improve their health.

Furthermore, social public value is considered essential in the era of openness as it may directly influence citizens' lives (Gebka et al., 2019). Evidence from this research showed an improvement in healthcare, specifically a reduction in child mortality. Furthermore, the activities of data journalists provided adequate evidence of the important role breastfeeding and incubators play in decreasing the high rate of child mortality in some regions in Ghana.

Additionally, the strategic public value embodies economic and political outcomes targeted at beneficiaries at the individual level and group level (Harrison et al., 2012). In this study, the strategic public value was also discussed as a deliberate attempt to leverage electronically published government data to trigger social changes. The created public value that fell into this category focused on using available datasets to empower citizens politically and economically at both the individual and group level. For example, the focus on creating e-solutions was deliberately done to empower farmers economically. DU identified farmers as individuals whose skills and knowledge had to be improved publishing and using OGD is expected to help intermediaries creatively build innovations that can result in the public good (Harrison et al., 2012).

8.10.3 Political Impact

It is vital for DU to recognize published datasets that will generate crucial public value (Gebka et al., 2019). One of such public values is citizens' ability to participate in government activities (Wang & Shepherd, 2020). The value generated through citizen participation (e-participation) led to decision-making grounded on data evidence (Sivarajah et al., 2016). Consequently, the country's signatory to the OGD provided additional grounds for DU or intermediaries to use published government data to critique and influence government policies and decisions. Government data was used as an established ground to both critique and encourage the activities of parliamentarians and the effects of such activities on their performance. These findings raised concerns about the actual intentions of individuals voted as parliamentary representatives. DU noted that such intentions are a causal factor to the behavior of



parliamentarians towards punctuality. OGD has given intermediaries and citizens a factual ground to question and critique government activities.

Political public value led to citizens' demanding accountability from the stewards they had put in places of authority. Through the use of OGD, citizens were equipped with the skills of interpretation and understanding of government activities through published government data. This understanding triggered the cause of accountability. Public officials were held responsible for their activities as gatekeepers of the country to promote trust, integrity, and development in the relationship between government and citizens.

8.10.4 Impact on Attitudes

The ideological outcome or public value reflects on the beliefs, ethical, and moral commitments and how they align with the activities of government (Harrison et al., 2012). This further indicates the importance of ensuring that the datasets published by DP and used by DU are targeted at meeting the needs of citizens (Janssen et al., 2012). Findings from this study revealed the change in citizens' long-held beliefs. These beliefs were held and revered without adequate factual evidence, but the use of published government brought about changes in the belief systems. Shared beliefs on child labour, poverty and child mortality were reviewed based. For example, the long-held view of poverty patterns in Ghana has been revisited or refined due to the OGD. This was made possible through data journalists who uncovered the existence of districts in the capital city (Greater Accra) whose standard of living was below the northern belt (which has long been considered as poorest in Ghana).

In addition, public value creation by using published data can be attributed to inadequate DU in the country and the confined symbolic capital of such actors. DU were already operating as technology-oriented organizations in the country. The focus of the DU was shifted using published government data as a technological tool to create public value as part of their purpose after Ghana joined the OGD movement. The background and the current focus on the DU might contribute to the limited public value created thus far from the use of OGD. This is due to the extensive focus on technologically oriented symbolic capital of actors. Hence access and possession of technical know-how as embodied in skilled people, technological tools, and demonstrable experience constituted the symbolic capital of these DU. Research has indicated that users of government data should include actors with varying symbolic capitals to influence the public value created (Ojo et al., 2015; Parasie & Dagiral, 2013). Consequently, the symbolic capital and knowledge of DU should not be limited to technology-oriented social actors as it



puts limitations on the public values that is created. Evidence from the current study confirms the need to have DU with different symbolic capital and knowledge. This is essential due to the limited public value thus far created by DU.

Also, a question that emerges from the limited created public value can be centered on whether there are inadequate assessment measurements to aid in unearthing and evaluating the public value that has been created thus far? Or are citizens' expectations different from the public value that is being created by DU? These two questions are essential in the OGD ecosystem due to evidence of existing research that has revealed the effects of inadequate evaluation mechanisms in Sri Lanka (Gebka et al., 2019) and differences in public value created and needs of citizens (Karunasena & Deng, 2010, 2012). Similarly, as indicated by Janssen et al. (2012), the difficulty of measuring the value of published government data lies in the inability to assess the 'Return on Investment' (ROI). This is due to the invaluable nature of published government data unless intermediaries use it.

8.11 Summary

The chapter discussed the empirical findings on the factors that enabled and constrained the institutionalization or publication and use of OGD in Ghana. The discussion was presented through the lens of the Structuration Theory, supporting literature, and other theories for extra categorization. Using the Structuration Theory, the emerging themes identified in the previous chapter were theoretically supported by understanding the created structures in the OGD ecosystem, how meanings were formed and the underlying practices and behavior that guide actors. The chapter showed that approved behaviors and practices in the ecosystem could be understood theoretically from the standpoints of Giddens' structures of signification, legitimation and domination.

The chapter revealed the existence of specific acceptable behaviors and practices that either constrained or enabled OGD institutionalization despite the implementation of OGD in Ghana. Discussing the findings through the selected theoretical lens revealed that data accumulation has always been in existence in Ghana PS led it. This resulted in data ownership, which led to increased perceptions of control as well as individual and organizational personalization of data. This, in turn, resulted in the practice were actors and institutions were unwilling to share the data for it to be published on a single data portal that a different government institution managed. In addition, there were issues with the rules that guided OGD in Ghana. While the RTI had been implemented, institutional regulations that had been in existence before the



implementation of the RTI were yet to be updated to acknowledge the guidelines of OGD publication and use. Also, the skills and knowledgeability of actors were unevenly distributed within the OGD ecosystem. For instance, intermediaries and DP were often better skilled than other actors in the ecosystem, and this negatively influenced data publication and subsequent use. The chapter also discussed the social enablers to OGD publication and use.

The social factors included network/alliances, a new dimension of data sharing emanated from the collaboration between selected public and private sectors, access and use of technological resources, aspects of regulatory mandate, network power, and myths surrounding data sharing. The factors that constrained OGD institutionalization in Ghana and the relevance of data in the openness made DU devise other ways by which they can have access to data. One such means was the creation of networks/alliances through which DU could socially collaborate with DP and PS enabling access to data or follow-ups on data quality challenges. Similarly, network power was demonstrated where actors formed different types of power that emanate from networks to enable them access to data and other resources. Actors' knowledgeability and ability to have access to technological resources was also an essential enabler to OGD institutionalization in Ghana. Finally, the chapter presented the impact of OGD in terms of the generated public value. The discussion revealed that the impact of OGD has been thus far focused on agriculture with evidence of potential impact that can be created economically. The reason for this was because DU use of OGD was dependent on the core mandate of the organization they belonged to. This was the case because most of the intermediary organizations were functional before Ghana joined the OGD movement. Thus using OGD came at an advantage to provide services to citizens by relying on available data.

CHAPTER 9: CONCLUSION

9.1 Introduction

The aim of this study was to investigate the patterns and behaviors that have influenced the institutionalization of OGD in Ghana and OGD's impact. Consequently, existing literature was reviewed on OGD in general, ICT adoption and use, OGD publication and use, an overview of OGD in sub-Saharan Africa, actors in the OGD ecosystem, the OGD ecosystem, emerging issues in OGD (trust, transparency, participation, and collaboration, data quality, legal framework, intermediaries and OGD, impact/public value and OGD). Additional literature was reviewed based on the empirical findings in this study; this included power, data ownership, network creation and alliances, data sharing culture, and OGD institutionalization. Chapter Three presented the theoretical foundation of this study; the chapter presented the initial conceptual model that guided the study; this was followed by Table 3.2, which provided explanations to how the initial conceptual model was changed due to the emerging themes from the empirical findings. Giddens' Structuration Theory was then discussed through the lens of the structures and other concepts that guide the theory. It also presented the additional categorization used to support the empirical findings theoretically. Chapter Four presented the methodology that guided the study, with explanations on the research paradigm, the research design and methods, research scope, case selection and data collection, documents and online resources, time span, and ethical considerations used in this study. Chapter Five presented the contextual background to the study with discussions on the OGPI, DP, DU, regulatory requirement, OGPI activities in Ghana, and reflections on the activities of DU in Ghana. Chapter Six present a thematic analysis of the empirical findings on the social factors that influenced OGD publication and use in Ghana. The codes and themes included regulatory concerns, control over data, collaboration, data sources, experiences, institutional rights/control, and ownership. Chapter Seven presented the final stage of thematic analysis (report generation), which discussed the aggregated themes and sub-themes identified in the previous chapter. Chapter Eight discussed the themes from the main theoretical lens (Structuration Theory and other theories used to give additional theoretical categorization to the themes). This chapter commences by revisiting the research questions and how each was addressed in the study. The chapter also discusses how this study applied the 'principles of



conducting an interpretivist research' (Klein & Myers, 1999b). The contributions of these are additionally presented, and finally, the conclusion and future research are presented.

9.2 Reexamining the Research Questions

This section presents a summarized version of the research questions presented in chapter one (1) and how they were addressed throughout the study. The research questions are presented below.

1. What are the socially created patterns and behaviors that influence OGD publication and use in Ghana?

The empirical findings from this study explained specific social factors that have influenced the institutionalization of OGD in Ghana. The social factors identified broadly included data ownership (relevance of data sources, complexities of data ownership, perceived solutions to the complexities of data ownership), data quality (data quality and institutional methodologies, communication and data quality), resources (human, technological and financial), data sharing culture (data sharing inter-organizational collaborations, data communities, and data teams), power in networks/alliances (informal networks) networks/ alliance (national, organizational and international networks/alliances), myths of data use, controlling data (institutional personalization, loss of control, right to access data), and regulatory mandate (institutional, and national regulations).

2. How does these socially created patterns and behaviors constrain and enable OGD publication and use in Ghana?

The socially created patterns and behaviors that influence OGD publication and use were identified qualitatively through thematic analysis using NVivo software. The empirical findings revealed that OGD publication and use in Ghana is influenced by specific socially created and recreated patterns and behaviors. These social patterns were created and recreated over time and have been institutionalized among organizational actors and their institutions. The organizationally accepted socially created patterns and practices were intentionally and unintentionally created through institutionalization and personalization. These practices and behaviors were repeatedly created by actors who were considered to be knowledgeable and skilled in matters concerning OGD publication, use, and value creation. Hence the behaviors and practices became generally acceptable and institutionalized in the OGD ecosystem. The social factors that constrained OGD publication and use in Ghana included data owners where actors perceived data, either institutional or individual 'property', that needed to be controlled



with regards to both publication and use. Furthermore, data quality was discussed as a constraint due to the lack of common methodologies that guide the data life cycle. The culture of data sharing was also discussed as a social factor that constrained OGD publication and use in Ghana: the meanings created and re-created regarding data sharing were unwillingness to share available data caused by bureaucratic institutional structures prior to the implementation of OGD but has affected its institutionalization. The uneven distribution of technological infrastructure and human resources among institutions in the OGD ecosystem in Ghana also added to the social factors that negatively affected the institutionalization of OGD in Ghana. In addition, there was an issue with different legislative mandates or rules that governed institutions regarding data collection, processing, storage, and use and national laws that were enacted to support the OGD movement were a bit conflicting. For example, while the RTI mandated government institutions to make data available for every citizen by publishing it on the approved single web portal, some institutional rules gave the institutions rights over 'controlling their' data. Finally, there existed commonly accepted institutional norms that had become legitimated structures over time that constrained OGD institutionalization.

Although the empirical findings revealed the existence of social factors that constrained OGD institutionalization in Ghana, social factors also enabled its institutionalization. Firstly, due to the constraints encountered in the publication and use of OGD by actors in the ecosystem, the actors' created networks/alliances where the mutual benefit was the core. Through the creation of networks and alliances, actors were able to use social collaborations and draw on the knowledgeability of each other to enable them to determine data quality before use. Actors and institutions in the ecosystem who had access to the required technological infrastructure as well as the skills, experiences, and knowledgeability on how to harness it to create value enabled OGD institutionalization. There was also a different perspective to data sharing culture that enabled the institutionalization of OGD in Ghana. This enabler was created through collaboration between public and private institutions with the aim of sharing and using data to create impact. Through network power, actors gained legitimacy through the alliances with multiple multinational organizations. This also enabled them to gain access to data that otherwise was supposed to be published but was yet to reach the public domain. There were also aspects of the institutional regulations that enabled the institutionalization of OGD in Ghana. For instance, aspects of institutional laws required DP to publish data already before the introduction of OGD. Furthermore, the implementation of the RTI and laws on data



protection provided sources of legitimization criterion that contributed positively to the institutionalization of OGD in Ghana.

3. What is the impact/public value created as a result of OGD publication and use in Ghana?

The study also presented the impact with regards to the public value created as a result of OGD publication and use. The impact was discussed based on how available OGD was used by intermediaries (DU) from the empirical findings. These included economic, social, political, and attitudinal change. The main economic and social impact created was agriculture, focusing on subsistence farmers. Although other impacts were created, they were minimal. The economic and social impact focused on leveraging data and technology to provide solutions to the challenges faced by farmers, help them profit from their products and improve their quality of life. Politically, citizens and DU were able to generate facts by using available data to critique activities by the government. For example, as stated in the empirical finding's intermediaries were able to question the accuracy of figures released by the government on the number of deaths recorded nationwide during the height of the COVID-19 pandemic in Ghana. Also, strongly held beliefs and norms concerning poverty patterns in the nation were changed due to the use of data.

9.3 Application of Klein & Myers (1999) in the Study

9.3.1 The Principle of Hermeneutic Circle

This principle explains how the understanding of humans are realized through the process of repetition between meanings presented by the parts and the whole. Thus understanding a phenomenon emanates from understanding the parts and their relationships (Klein & Myers, 1999). The researcher in this study attempted to understand OGD institutionalization in Ghana and the created impact/public value applied this principle by relying on research published in this area, this formed the interdependent part. For example, there was a shift in using the initial conceptual framework because the concepts did not really explain the emerging themes, so the researcher moved to Structuration Theory but still used some of the theoretical concepts and added additional ones for theoretical categorization. Data analysis started after the first interview was transcribed to guide the subsequent interviews.

Also, an understanding of the whole emanated was gained when the researcher interacted with the selected actors in the OGD ecosystem in Ghana on OGD institutionalization and



impact/public value. Prior to the interaction between the research and the interview participants, the researcher had predetermined opinions about the subject matter based on literature which explained from the global perspective that countries who have implemented OGD were either having challenges with low usage or low publication of data (Wang & Lo, 2016; Wang, Shepherd, & Button, 2019); limited research that focused on the multiple stakeholder nature of OGD (González-Zapata & Heeks, 2015) and a need of research to uncover the impact/public value of OGD from multiple stakeholder perspectives (Gascó-Hernández et al., 2018; Jetzek et al., 2016; Wang & Lo, 2016). The perception of the researcher with regards to OGD was linked to it being an intervention that required the inclusion of technology into government activities; through this, government data was expected to make available electronically and legally. The requirement for electronic and legal availability was for all government data to be published in machine-readable formats on a single approved web portal and implement laws such as the RTI, respectively. From available literature, the researcher perceived that Ghana being part of the OGD meant OGD had been institutionalized in Ghana. The researcher expected organizations who use available data to focus only on data available on the portal. Also, a literature review conducted by the researcher informed her of factors such as data quality, transparency, laws, accountably affected OGD successful institutionalization globally.

9.3.2 The Principle of Contextualization

The principle of contextualization ‘requires that the subject matter be set in its social and historical context so that the intended audience can see how the current situation under investigation emerged’ (Klein & Myers, 1999, p. 73). This differs from positivist research as it sees humans as possessing the ability to think and act and the fact that their actions enable them to create both physical and social reality that surrounds them (Orlikowski & Baroudi, 1991). Before joining the OGD movement, Ghana has been known to be practicing democracy since 1992. The concepts that guide democracy are similar to that of OGD; they include transparency, accountability, and promoting citizen participation in government activities. However, with OGD, these concepts were expected to be realized through technology to make government data available. Upon Ghana’s signatory to the OGPI NITA was tasked to develop the web portal, NITA and GSS were mandated as the main institutions to control the population of the portal, action plans were developed and implemented within a two year interval and finally the RTI was also implemented (Ghana Open Data Initiative, 2012; Ohemeng & Ofosu-Adarkwa, 2015; World Bank Group, 2015).



Breaking through and accessing the actual actors in the OGD ecosystem in Ghana was challenging; emails sent by the researcher were either not responded to or the email addresses were wrong. However, the researcher was selected as a country researcher for the Africa Data Revolution Report and Open Data Barometer report in 2018. Through this, the researcher was introduced to some country directors of multinational organizations, these directors, through snowballing electronically introduced the main actors in the OGD ecosystem in Ghana to her. The researcher was also able to interact with some key actors during the 2018 open data conference held in Argentina. The researcher's first interview was with the SDG and data team of DP, who then linked the researcher to some PS as well as some of the non-governmental organizations who used published data to create impact/public value. This example shows the multiple stakeholder nature of actors in the OGD ecosystem in Ghana and networks/alliances that had been created between actors. The first round of the interview was face-to-face, which allowed the researcher to observe, understand and experience social issues and symbolisms that have influenced OGD institutionalization. For example, during the group interviews, the researcher observed some kind of power dynamics in relation to the symbolic capital of the interview participants. Also, the researcher gained knowledge into why data sharing was a challenge and became a constrain; structures had been created before the introduction of technology into governance and currently OGD. These structures created the perception and behavior of some actors that resulted in control of 'institutional data'. The participants agreed to the interview after the researcher sent her research proposal and the interview guide by email or personally. After this, some respondents gave disclaimer statements while others did not want to be recorded. Some of the participants only agreed to the interview after the electronic introduction by the country directors. These participants insisted the researcher called the country director to confirm that they participated in the interviews. There were also instances where the researcher had to either introduce herself by referring to the name of the country director or the participant the mentioned the name or referred to the e-introduction. This behavioral pattern and practice confirm the importance of creating networks/alliances in the OGD ecosystem in Ghana. After the first round of the face-to-face interviews, the subsequent follow-up interviews were done either by phone call. This was possible because a relationship with mutual benefit had already been established between the researcher and the participants. Though this principle was evident in most parts of the study, it was mainly applied and evident in chapter five, which presented the contextual background of the study and subsequently informed the subsequent chapters.



9.3.3 The Principle of Interaction Between the Researchers and the Subjects

Interpretive research ‘suggests that facts are produced as part and parcel of the social interaction of the researchers with the participants’ (Klein & Myers, 1999, p. 74). This study relied on qualitative data collection; thus, the principle was applied at every stage of the study the study. The interaction between the researcher and the interview participants was face-to-face and virtually. Electronic mails and electronic referrals were used for the pilot interviews. The actual interviews took the form of face-to-face. The follow-up interviews were done via emails and phone interviews (specifically WhatsApp calls). The researcher also attended workshops and training seminars organized by some DU. Attending these workshops and training seminars enabled the confirm the data gathered from both secondary and primary sources. Hence different mediums of communication were used to enable the researcher to interact with the interview participants and thereby gather relevant/quality data. The mediums of communication included face-to-face emails and WhatsApp calls. The respondents’ responses influenced the understanding and views of the researcher, for example, the researcher’s understanding of actors in the OGD ecosystem changed. Prior to the interview, the researcher’s views were shaped by information gathered online and through experiences. The interview participants came to appreciate the role of academic research in OGD during the interaction. In addition, how the views and attitudes of the interviewees changed by virtue of being studied or observed and being asked specific questions. That is specifically to respond to, and therefore reflect on, specific angles were observed by the researcher.

9.3.4 The Principle of Abstraction and Generalization

Klein & Myers’ (1999, p. 72) principle of abstraction and generalization stipulates ‘relating the ideographic details revealed by data interpretation through the application of the first two principles to theoretical, general concepts that describe the nature of human understanding in social action’. This principle enables researchers to discuss their empirical findings from the lens of specific theoretical interpretations.

Empirical and secondary data were used to understand OGD institutionalization and thereby providing understanding and explanation of the social factors that either constrain or enable OGD publication in Ghana and the generated impact/public value from the context of Ghana. The study started with secondary data collection and analysis; this was aimed at understanding the OGD ecosystem in Ghana without any theoretical lens guiding the process. This enabled the researcher to understand how the Ghanaian context prior to and after the introduction of OGD created specific structural behaviors and practices that became normalized and acceptable



practices and behaviors. The empirical findings and data from secondary sources were thematically analyzed to provide evidence-based insight into OGD institutionalization in Ghana. The understanding unearthed from the data provided knowledge and understanding into the issues surrounding data ownership, institutional and personalized control of data, data sharing culture, data quality, regulatory mandate, network/alliance creation, network power, technological and human infrastructure as social factors that either constrained or enabled OGD publication and use. The impact/public value created includes economic, political, and social impact. Through the lens of Structuration theory, Public value framework, and Castells' and Honoré's categorizations the study revealed the following

1. The actors in the OGD ecosystem in Ghana created structures that became acceptable.
2. The multiple actors in the OGD ecosystem were knowledgeable of practices and behaviors that either constrained or enabled OGD institutionalization.
3. Actors' knowledge of the structures that constrained OGD publication led to creating additional structures that enabled them access data that was not published on the approved web portal.
4. Access to technology and possessing the required knowledge and skills to use the available technology gave actors power over others.
5. The knowledgeability of actors and the purpose of the organization they belonged to determine the data used and influenced the impact/public value.

9.3.5 The Principle of Dialogical Reasoning

This principle 'requires sensitivity to possible differences in interpretations among the participants as are typically expressed in multiple narratives or stories of the same sequence of events under study' (Klein & Myers, 1999, p. 72). The principle of ideological reasoning argues that, even with multiple accounts from study participants, the accounts will reveal something, even if they all relate to it as they saw it. The purpose of the data collection strategy used was to understand what the researcher had learnt prior to the interaction with the interview participant and the actual social factors that either constrained or enabled the institutionalization of OGD in Ghana and the impact/public value created. The researcher spent four months in the field plus additional two weeks for a follow-up interview. The length of time spent with the interview participants on the field approved for dialogical process that enabled the researcher to address contradictions related to OGD institutionalization from the context of a developing country, Ghana. For example, since Ghana joined the OGD movement



in 2011, the researcher expected that OGD had been institutionalized. With actors aware of the concept of OGD and its benefits, despite the challenges related to the adoption and use of technology in government initiatives. This knowledge and assertion were founded on Ghana's partnership with the OGD I (Ohemeng & Ofosu-Adarkwa, 2015); the value that is expected to be created as a result of OGD publication and use (Lourenço, 2016) and the pressures that has caused a global shift towards data openness (Mutuku & Mahihu, 2014a). Findings from this research showed that the predetermined understanding the researcher held was contradictory to actual events from the context. Based on the social factors identified to influence OGD publication and use, it is evident that despite Ghana's signatory to the OGD movement in 2011 and the laws that exist to support it, institutionalizing OGD is yet to be realized due to contextual influences. The principle of dialogical reasoning 'requires the researcher to confront his or her preconceptions (prejudices) that guided the original research design with the data that emerge through the research process (Klein & Myers, 1999b, p. 76). Through ideological reasoning and vigorous involvement, the researcher became aware of socially constructed realities based on the reflexive procedure of gaining in-depth insight into the phenomenon of OGD from the perspective of different actors in Ghana.

9.3.6 The Principle of Multiple Interpretation

This principle 'requires sensitivity to possible differences in interpretation among the participants, typically expressed in multiple narratives or stories of the same sequence of events under study' (Klein & Myers, 1999, p. 72). The principle of multiple interpretations is like the testimony of several witnesses, even if they all relate to the same story. The first attempt to understand the phenomenon under study was to use secondary data. The results were used to identify the actors in the OGD ecosystem and guide the interview. The interviews were interactive and the shared understanding that emerged from the interaction was based on the interpretation of the interview participants and the researcher's views. Thus the diverse and shared knowledge that emerged from the interaction between the researcher and the interview participants helped create the understanding of OGD institutionalization in Ghana. Incorporating triangulation in the study enabled the researcher to authenticate the data gathered from both secondary and primary sources aimed at explaining the social setting of the phenomenon of interest.

The reliability of the data used that informed the findings of this study was proved through the use of multiple sources of data collection. For example, actors in the OGD ecosystem had multiple understandings and interpretations of data ownership, data quality, OGD/open data.



Interview participants from the multinational organizations perceived that data belonged to citizens hence the need to publish it and adhere to the principles of the OGPI. Actors within the local OGD ecosystem had divergent views with regard to data ownership. The meaning these actors ascribed to data was that of ‘institutional’ and ‘individual’ personalization, which subsequently influenced the meaning attached data ownership and the tendency to publish data. Multiple interpretation was also evident in attempting to understand the concept of data quality from the perspectives of multiple actors. Evidence from the empirical findings revealed that while DU used technology, data communities, and data teams to screen data to determine its quality before use, DP and PS used organizationally distinct methodologies to ensure that data accumulated was of good quality before publication or storage. While DU and DP interpreted OGD as the government making data technically available on a single web portal, PS interpreted the same concept as the availability of some data. However, there were contradictions in the data. That is, the fact that different interviewees held different or opposite views (multiple truths), but all the views were valid from their respective perspectives or world views. The above cases prove that the principle of multiple interpretations was used in this study.

9.3.7 The Principle of Suspicion

This principle ‘requires sensitivity to possible biases and systematic distortions in the narratives collected from participants’ (Klein & Myers, 1999, p. 72). The principle of suspicion was unearthed during both the face-to-face and remote interviews of multiple stakeholders from different institutions. A follow-up question on their knowledge of Ghana’s signatory to the OGPI and its influence on data availability resulted in responses considered facetious in nature. For example, although Ghana has been a signatory to the OGPI since 2011, the perceptions of some interview respondents revealed the unwillingness to make their data available to be published on the single approved web portal based on institutional and scientific methodological differences. Also, the principle of suspicion was unearthed during the group interviews. The researcher observed that the team leaders dominated the discussions and could easily interrupt the other team members during the interview process. The researcher observed some instances where team leaders interrupted the responses of their team members to some of the questions. This was explicitly visible among DP, where internal politics may have trumped ‘truth’. There were some statements like, *“no, that was not what he was saying, what he is saying is that we are aware of the OGD, we are organizing ourselves to make the data available*



on the platform” (DPI). There were instances where the interviewees’ response to questions was the ‘official version of the truth,’ knowing that the actual facts are different.

9.4 Contribution

This section presents the contributions, recommendations, limitations, and directions for future research.

9.4.1 Contribution to OGD Research

Though there has been research on OGD in developing countries, including a few that has focused on Ghana, a limited number of these studies have focused on highlighting the social and contextual factors that have influenced OGD institutionalization from multiple stakeholder perspectives and the impact/public value thus far created. This may be attributed to the beginning nature of the OGD phenomenon as a whole (Zuiderwijk & Janssen, 2013, 2014). This study offered an understanding of social and contextual factors that constrained and enabled OGD publication and use from the context of a developing country and the impact created. Through the lens of the Structuration Theory and other additional theoretical explanations, this study contributes to empirically based interpretive research in Information Systems on OGD from the perspective of developing countries. This study also contributes to theory by stipulating a broad interpretation and understanding of how specific behaviors and practices have shaped the OGD ecosystem and thus affected its institutionalization in Ghana. The study contributes to OGD research through

1. The provision of an in-depth understanding into OGD from the perspective of a developing country.
2. Identification of social factors that influence OGD institutionalization (publication and use) as well as public value creation in Ghana.
3. Demonstration of how the identified social factors either constrained or enabled OGD institutionalization.
4. Demonstration of how the identified social factors were created by institutional actors and now these factors have influenced OGD institutionalization in the ecosystem.
5. Showing how the social factors identified played crucial roles in the institutionalization of OGD from the context of a developing country.
6. Demonstration of the types of impact/public value created as a result of OGD publication and use.



7. This is the first most in-depth study of OGD in Ghana which is typically an under-research country.

9.4.2 Contribution to Methodology

In other to identify and understand the created and recreated social factors that influenced the publication and use of OGD in Ghana and the created public value. The main theoretical lens used was Giddens' Structuration Theory, which provided in-depth understanding of the perceptions, practices, and behaviors of actors, how they are created and recreated and situating OGD in the context of social action where actions of actors are interpreted. However, additional theoretical categorization, this study applied Castells' Network Theory, Honoré's categorization of ownership and Public Value Framework (Harrison et al., 2012). Findings from the data supported three of Castells' categorizations, Honoré's explanation of ownership was used in this study to provide an understanding of the bureaucratic processes that have influenced OGD institutionalization concerning actors' perception of data ownership as both an individual and institutional right. The Public Value Framework enabled the researcher to categorize the findings on the impact/public value created in response to the last research question. These theories were used to explain of how socially constructed factors influence OGD publication, use, and public value creation as a result of OGD use by data users in Ghana.

To understand the phenomenon of interest this research methodologically adopted an interpretive paradigm and the seven principles that guide the evaluation of interpretive research in Information Systems. This was to enable the researcher provide understanding into the social factors and how they either constrain or enable the institutionalization of OGD and the impact through the lens of public value. The interview participants used in this study were chosen from different organizations with different contextual backgrounds. The purpose of selecting different actors to partake in the study was due to the multiple stakeholder nature of the OGD ecosystem. This also provided in-depth empirical data on the phenomenon of interest.

9.4.3 Contribution to Theory

Structuration Theory as the primary theoretical lens provided unique explanations to the social factors that enabled and constrained OGD publication and use and subsequently its institutionalization in Ghana. Structuration Theory revealed an extensive understanding actors' perception and how the perceptions created practices and behaviors that influenced the institutionalization of OGD. Using Structuration Theory also enabled the researcher to understand OGD and the actors' actions in the ecosystem from a social standpoint. The

uniqueness of the theoretical contribution can also be traced to the use of additional theoretical lenses that provided different theoretical categorization to explain networks, data ownership, and public value/impact. The combination of theories is considered an acceptable practice in IS research (Gregor, 2006). Therefore, this responds to the gap in the need for researchers to combine different theoretical lenses in OGD research (Zuiderwijk, Helbig, Gil-García, & Janssen, 2014). Although Structuration Theory was the overarching theory in this study, additional theoretical concepts unearthed additional theoretical explanations to the emerging themes. The application of extra supporting theories to explain the phenomenon of interest based on the empirical findings provided a unique and novel approach to understanding. Structuration Theory also provided an in-depth understanding of the phenomenon of interest. This study demonstrated a unique application of ST, Castells' Network Theory, Honoré's categorization of ownership and public value framework on empirical data from interview participants across different organizations and contexts. The suitability of the selected theories and the multiple empirical evidence is intensified through interpretivism and a cross-sectional time span. This study contributes methodologically to OGD research in developing countries by using a combination of theories to understand the phenomenon of interest. This briefly is explained in the diagram below.

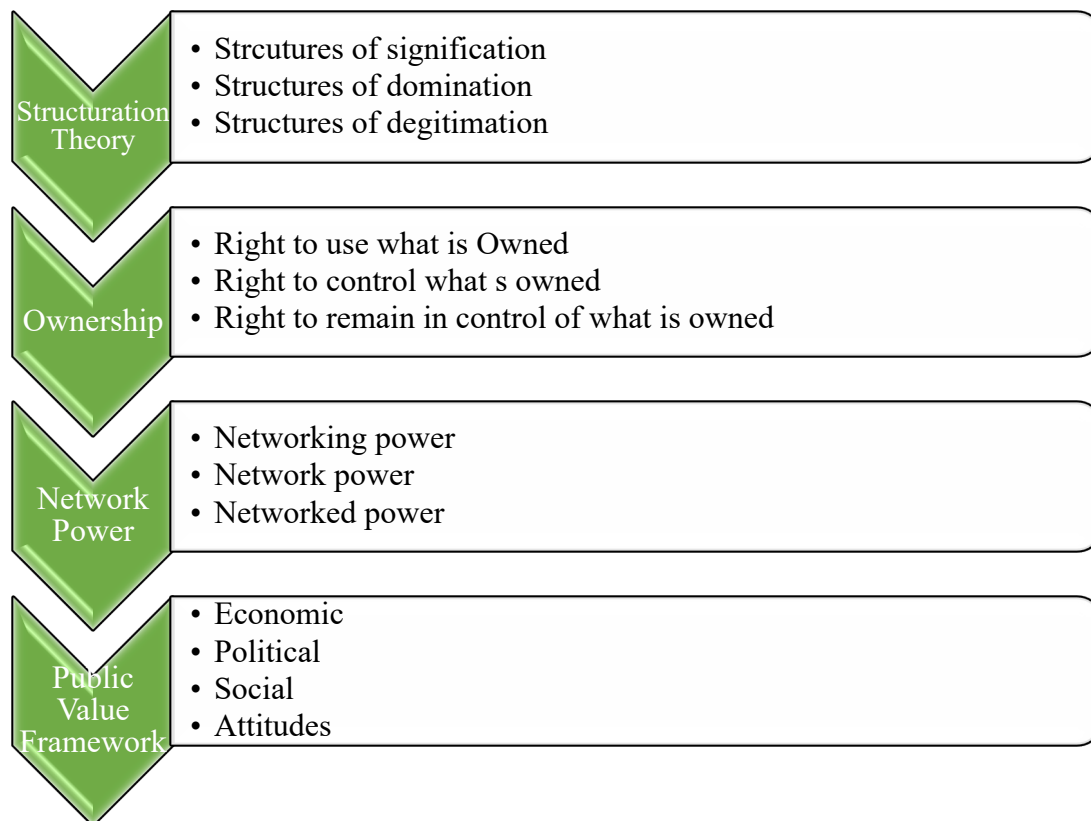


Figure 18: Combination of theories



9.4.4 Contribution to Practice

Applying the interpretive research paradigm in this study provides policy makers, funders, researchers and practitioners with improved understanding of the social factors influencing OGD institutionalization and impact/public value generation in Ghana. This understanding will enable policymakers, funders, and practitioners to plan and develop context-specific strategies and policies that will lead to the successful institutionalization of OGD in Ghana.

Although RTI has been passed it is important to consider implementing policies that will focus on the technological component, making procedures in institutions less bureaucratic, and reducing the perceptions of independency among institutions. OGD has paved the way to ensure that data was made available in machine-readable formats and at the least cost possible. For example, policies need to be put in place to ensure that the right technology, including knowledge and skill to use it was available. Such policies may be able to change the mind sets of actors and pave the way for a successful institutionalization of OGD in Ghana. International organisations that currently have a stake in promoting of OGD (for example, UNDP and other international funding and good governance agencies) need better understanding of the local conversations and real situations on the ground ('the myths and realities'). This will help them better with future funding and initiatives around OGD.

9.5 Recommendations

Some recommendations emanating from the study include

1. Although the RTI has been passed, the country can employ strategies such as change management strategies that are targeted at all the actors in the OGD ecosystem in Ghana.
2. The country needs to focus on sensitizing and educating actors in the ecosystem on the importance of publishing data on a single approved web portal. Acquiring adequate knowledge on data sharing and the importance of making data available will help curb the practice and behavior of control and ownership of data.
3. The country needs to implement an OGD policy guideline that will address the discrepancies in the diverse institutional scientific methodologies that govern Ghana's data life cycle.



4. Also, there is a need to implement OGD policy and law that define activities across all the institutions, reducing the contradictory policies or laws that may be blocking the progress or successful institutionalization of OGD in Ghana.
5. In addition, actors in-charge of implementing the OGD in Ghana needs to create context-specific data quality indicators that will be used across all institutions. This will increase the amount of data published on the portal and reduce the time and money spent during discussions as data communities and data teams.
6. The country needs increase data use and subsequently the impact/public value by establishing DU organizations that are targeted at using different types of data available to create value (social and technological interventions). This is important because the DU organizations are focused on using data that reflects their core objectives. Thus when such data is not available, networks/alliances are created, or they engage in collecting data that may already be available.
7. The country needs to develop strategies that will led to an increase in inter-organizational (public-private sector partnerships) partnerships activities centered on data sharing and using available data to create social and technological interventions.
8. The successful institutionalization of OGD in Ghana will require funders, government and non-government agencies to dive deeper into institutional practices and behaviors that existed prior to the introduction of OGD but tend to influence its institutionalization. This can be done through dialogue, education and training.
9. Finally, the successful institutionalization of OGD in the country may also require the implementation of a parallel or phased approach rather than a complete takeover which has resulted in some hesitancy. The parallel or phased approach will lead to a gradual introduction of OGD and the need to have all data on a single approved web portal.

9.6 Limitations of the Study and Areas of Further Research

This study focused on identifying, understanding, and explaining how socially created and recreated patterns and behaviors constrained or enabled OGD institutionalization in Ghana and the created impact/public value. This study was conducted from a multiple stakeholder perspective. Although using the Structuration Theory as the leading theoretical lens to the study, the theory did not provide enough theoretical understanding into the technological component of OGD. Also, Structuration Theory did not explain the possibility of changing the structures to enable the successful institutionalization of OGD in Ghana. Despite these theoretical limitations, the use of the theory leads to unearthing the social practices and



behaviors that constrain or enable OGD institutionalization. The use of additional theoretical categorization provided extra explanation and understanding of the findings.

Future research could also focus on the contradictions in the open data policies and how this law is defined across all institutions. Prospective study may explain how contradictory policies or rules block the progress of OGD in Ghana and other sub-Saharan countries. This will be important for policy makers, data publishers, users, the international communities, and researchers. It will inform these stakeholders of legislative influence on OGD and how to structure and update national, institutional, and international laws to enhance OGD use. Future research could also focus on the reasons behind symbolic sanctions instead of actual or real sanctions. The research approach used in this study can be applied to countries in sub-Saharan Africa and perhaps other developing countries at a similar stage of socio-economic-political development or a comparable level of OGD maturity.

REFERENCES

- Adelson, B. (1999). Developing strategic alliances: A framework for collaborative negotiation in design. *Research in Engineering Design-Theory, Applications, and Concurrent Engineering*, 11(3), 133–144.
- Afful-Dadzie, E., & Afful-Dadzie, A. (2017a). Liberation of public data: exploring central themes in open government data and freedom of information research. *International Journal of Information Management*, 37(6), 664–672.
- Afful-Dadzie, E., & Afful-Dadzie, A. (2017b). Open government data in Africa: A preference elicitation analysis of media practitioners. *Government Information Quarterly*, 34(2), 244–255.
- Al-Hujran, O., Al-Debei, M. M., Chatfield, A., & Migdadi, M. (2015). The imperative of influencing citizen attitude toward e-government adoption and use. *Computers in Human Behavior*, 53, 189–203.
- Al-Sobhi, F., Weerakkody, V., & Mustafa Kamal, M. (2010). An exploratory study on the role of intermediaries in delivering public services in Madinah City. *Transforming Government: People, Process and Policy*, 4(1), 14–36.
- Alanazi, J. M., & Chatfield, A. T. (2012). Sharing government-owned data with the public: A cross-country analysis of open data practice in the Middle East. *18th Americas Conference on Information Systems 2012, AMCIS 2012*, 1, 335–344.
- AlAwadhi, S., & Morris, A. (2008). The Use of the UTAUT model in the adoption of e-government services in Kuwait. *Hawaii International Conference on System Sciences, Proceedings of the 41st Annual. IEEE*, 219.
- Alawneh, A., Al-Refai, H., & Batiha, K. (2013). Measuring user satisfaction from e-Government services: Lessons from Jordan. *Government Information Quarterly*, 30(3), 277–288.
- Albano, C. S. (2013). Open government data: a value chain model proposal. *Proceedings of the 14th Annual International Conference on Digital Government Research-Dg.o '13*, 285.
- Alexopoulos, C., Loukis, E., & Charalabidis, Y. (2016). A methodology for determining the value generation mechanism and the improvement priorities of open government data systems. *Computer Science and Information Systems*, 13(1).
- Alexopoulos, C., Zuiderwijk, A., & Charapabidis, Y. (2014). Designing a second generation of Open Data platforms : *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 230–241.
- Alford, J., & O'Flynn, J. (2009). Making sense of public value: Concepts, critiques and emergent meanings. *International Journal of Public Administration*, 32(3–4), 171–191.
- Alhassan, R. (2020). Are Ghanaians ready to take advantage of the new right to information law? Retrieved from <https://www.dw.com/en/are-ghanaians-ready-to-take-advantage-of-the-new-right-to-information-law/a-52171600>.



- Alhojailan, M. I., & Ibrahim, M. (2012). Thematic analysis : A critical review of its process and evaluation. *WEI International European AcademicConference Proceedings*, 1(2011), 8–21.
- Ali Hassan, M. I., & Twinomurinzi, H. (2018b). A Systematic Literature Review of Open Government Data Research: Challenges, Opportunities and Gaps. In *2018 Open Innovations Conference, OI 2018* (pp. 299–304). IEEE.
- Allen S . Lee. (1991). Integrating positivist and interpretive approaches to organizational research. *Organization Science*, 2(4), 342–365.
- Alonso, J. M. (2012). New project: Ghana open data initiative. Retrieved June 6, 2018, from <https://webfoundation.org/2012/02/ghana-godi-launch/>.
- AlYahmady, H. H., & Al Abri, S. S. (2013). Using Nvivo for data analysis in qualitative Research. *International Interdisciplinary Journal of Education*, 2(2), 181–186.
- Ansah, A. (2018). Journalists embrace data journalism. Retrieved November 20, 2019, from <http://thechronicle.com.gh/index.php/2018/11/21/journalists-embrace-data-journalism/>.
- Ansari, B., Barati, M., & Martin, E. G. (2021). Enhancing the usability and usefulness of open government data: A comprehensive review of the state of open government data visualization research. *Government Information Quarterly*, 101657.
- Antwi-Boasiako, A. (2016). *Implementation of data protection legislation in Ghana. Ad Hoc Expert Meeting on Data Protection and Priva*. Retrieved from https://unctad.org/meetings/en/Presentation/dtl_eweek2016_AAantwi-Boasiako_en.pdf.
- Archer, M. (1990). Human agency and social structure: a critique of Giddens. Anthony Giddens: consensus and controversy.
- Archer, Margaret. (1996). Social integration and systems integration: Developing the distinction. *Sociology*, 30(4), 679–699.
- Arzberger, Peter; Schroeder, Peter; Beaulieu, Anne; Bowker, Geof; Casey, Kathleen; Laaksonen; Moorman, David; Uhler, Paul; Wouters, P. (2004). An International Framework to Promote Access to Data, 1053(February), 2004.
- Attard, J., Orlandi, F., Scerri, S., & Auer, S. (2015). A systematic review of open government data initiatives. *Government Information Quarterly*, 32(4), 399–418.
- Avgerou, C. (2000). IT and Organizational Change: An Institutional Perspective. *Information Technology & People*, 13(4), 234–262.
- Baack, S. (2015). Datafication and empowerment: How the open data movement re-articulates notions of democracy, participation, and journalism. *Big Data & Society*, 2(2).
- Bacharach, S. B. (1989). Organizational theories : Some criteria for evaluation linked references are available on JSTOR for this article : Organizational Theories : Some Criteria for Evaluation. *Academy of Management Review*, 14(4), 496–515.
- Badiee, S., Belkindas, M., Swanson, E., Appel, D., Crowell, J., Farivari, R., ... Geiser, M. (2016). *Odin 2016 Annual Report*. Retrieved from <http://odin.opendatawatch.com/Downloads/otherFiles/ODIN-2016-Annual-Report.pdf>.
- Banisar, D. (2004). *The Freedominfo. org Global Survey: freedom of information and access*



- to government record laws around the world (pp. 247-253). Freedominfo. org.
- Bara, B. G., Bucciarelli, M., & Lombardo, V. (2001). Model theory of deduction: A unified computational approach. *Cognitive Science*, 25(6), 839–901.
- Bariff, M. L., & Galbraith, J. R. (1978). Intraorganizational power considerations for designing Information Systems. *Accounting, Organizations and Society*, 3(1), 15–27.
- Barley, S. (1986). Technology as an occasion for structuring : Evidence from observations of CT scanners and the social order of radiology departments. *Administrative Science Quarterly*, 31(1), 78–108.
- Barnes, B. (1986). *On authority and its relationship to power*. In: *Power, Action and Belief. Sociological Review Monograph*; 32 (Law, J. (e, Vol. 32). Routledge & Kegan Paul, London, UK.
- Barratt, M., Choi, T. Y., & Li, M. (2011). Qualitative case studies in operations management: Trends, research outcomes, and future research implications. *Journal of Operations Management*, 29(4), 329–342.
- Basit, T. N. (2003). Manual or electronic? The role of coding in qualitative data analysis. *Educational Research*, 45(2), 143–154.
- Baskerville, R. L. (1999). Investigating information systems with action research. *Communications of the Association for Information Systems*, 2(October).
- Bates, J. (2014). The strategic importance of information policy for the contemporary neoliberal state: The case of open government data in the United Kingdom. *Government Information Quarterly*, 31(3), 388–395.
- Baxter, P., & Jack, S. (2008). The qualitative report qualitative case study methodology: study design and implementation for novice researchers. *The Qualitative Report*, 13(4), 544–559.
- Bekkers, V., & Moody, R. (2011). Visual events and electronic government: What do pictures mean in digital government for citizen relations? *Government Information Quarterly*, 28(4), 457–465.
- Bekkers, V., & V., H. (2005). *The information ecology of e-Government: e- Government as institutional and technological innovation in public administration* (eds). Amsterdam.: IOS Press, Amsterdam.
- Benbasat, I., Goldstein, D. K., & Mead, M. (1987). The case research strategy in studies of Information Systems Author(s): *MIS Quarterly*, 11(3), 369–386.
- Benbasat, I., & Zmud, R. W. (2003). The identity crisis within the IS discipline: Defining and communicating the discipline's core properties. *MIS Quarter*, 28(4), 183–194.
- Benington, J. (2009). Creating the public in order to create public value? *International Journal of Public Administration*, 32(3–4), 232–249.
- Bennett, C. J. (1997). Understanding ripple effects: The cross-national adoption of policy instruments for bureaucratic accountability. *Governance*, 10(3), 213–233.
- Bergman, J., Jantunen, A., & Saksa, J. M. (2004). Managing knowledge creation and sharing-scenarios and dynamic capabilities in inter-industrial knowledge networks. *Journal of*



Knowledge Management, 8(6), 63–76.

- Bernardi, R. (2018). Health information systems and accountability in Kenya: A structuration theory perspective. *Journal of the Association of Information Systems*, 18(12), 931–957.
- Berners-Lee, T. (2009). Linked Data. Retrieved December 23, 2020, from <https://www.w3.org/DesignIssues/LinkedData.html>
- Bertot, John C, Jaeger, P. T., & Grimes, J. M. (2010). Using ICTs to create a culture of transparency : E-government and social media as openness and anti-corruption tools for societies. *Government Information Quarterly*, 27(3), 264–271.
- Bertot, John Carlo, Jaeger, P. T., & Hansen, D. (2012). The impact of policies on government social media usage: Issues, challenges, and recommendations. *Government Information Quarterly*, 29(1), 30–40.
- Bilykh, I., Bilykh, I., Bychkov, Y., Bychkov, Y., Dahlem, D., Dahlem, D., ... Kuziemy, C. (2003). Can GRID services provide answers to the challenges of national health information sharing? *Proceedings of the 2003 Conference of the Centre for Advanced Studies on Collaborative Research*, 39–53.
- Birks, D. F., Fernandez, W., Levina, N., & Nasirin, S. (2013). Grounded theory method in information systems research: Its nature, diversity and opportunities. *European Journal of Information Systems*, 22(1), 1–8.
- Bitektine, A. (2008). Prospective case study design qualitative method for deductive theory Testing. *Organizational Research Methods*, 11(1), 160–180.
- Boell, S., & Blair, W. (2019). www.litbaskets.io , an IT Artifact Supporting Exploratory literature searches. *Australasian Conference on Information Systems*, (October).
- Boell, S. K., & Cecez-Kecmanovic, D. (2014). A hermeneutic approach for conducting Literature reviews and literature searches. *Communications of the Association for Information Systems*, 34(January), 257–286.
- Bonina, C., & Eaton, B. (2020). Cultivating open government data platform ecosystems through governance: Lessons from Buenos Aires, Mexico City and Montevideo. *Government Information Quarterly*, 37(3), 101–479.
- Bostrom, R., Gupta, S., & Thomas, D. (2009). A meta-theory for understanding information systems within sociotechnical systems. *Journal of Management Information Systems*, 26(1), 17–47.
- Bourdieu, P. (1996). *Theory, Culture & Society*. SAGE, London, Thousand Oaks and New Delhi.
- Bourdieu, P., & Wacquant, L. J. (1992). *An Invitation to Reflexive Sociology*. Cambridge: Polity Press.
- Bourdieu, Pierre. (1993). *The Field of Cultural production, or: The economic World Revised*. Colombia University Press.
- Bowen, G. A. (2009a). *Document analysis as a qualitative research method*. *Qualitative Research Journal* (Vol. 9).
- Bozeman, B. (2002). Public-value failure: When efficient markets may not do.’ Public Administration Review. *Public Administration Review*, 62(2), 145–161.



- Braun, V., & Clarke, V. (2006a). Qualitative research in psychology using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Braun, V., & Clarke, V. (2006b). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101.
- Braun, V., & Clarke, V. (2014). What can “thematic analysis” offer health and wellbeing researchers? *International Journal of Qualitative Studies on Health and Well-Being*, 9, 20–22.
- Braun, V., Clarke, V., Nikki Hayfield, & Terry, G. (2019). *Thematic analysis. Japanese Association of Qualitative Psychology NII-Electronic Library Service* (Vol. 5).
- Bryson, J., Sancino, A., Benington, J., & Sørensen, E. (2017). Towards a multi-actor theory of public value co-creation. *Public Management Review*, 19(5), 640–654.
- Buhr, N. (2002). A structuration view on the initiation of environmental reports. *Critical Perspectives on Accounting*, 13(1), 17–38.
- BusinessGhana. (2018). Workshop on Open Data and Development Opens. Retrieved November 19, 2019, from <https://www.businessghana.com/site/news/general/170247/Workshop-on-open-data-and-development-opens>
- Butler, T om. (1998). Towards a hermeneutic method for interpretive research in information systems. *Journal of Information Technology*, 13, 285–300.
- Butler, Thomas, Fitzgerald, B., & Butler, T. (1997). A case study of user participation in the information systems development process.
- Caldeira, M. M., & Ward, J. M. (2003). Using resource-based theory to interpret the successful adoption and use of information systems and technology in manufacturing small and medium-sized enterprises. *European Journal of Information Systems*, 12(2), 127–141.
- Callon, M. (1998). Actor-Network Theory—The Market Test. Actor Network Theory and after. Law, J., Hassard, J., Eds.
- Caroline J. Tolbert, & Karen Mossberger. (2006). The effects of e-Government on trust and Confidence in government. *Public Administration Review*, 66(3), 354–369.
- Casey, D. (2014). Issues in using methodological triangulation in research. *Nurse Researcher*, 16(4), 40–55.
- Casson, M., & Della Giusta, M. (2007). Entrepreneurship and social capital: Analysing the impact of social networks on entrepreneurial activity from a rational action perspective. *International Small Business Journal*, 25(3), 220–244.
- Castells, M. (2011). A Network Theory of Power. *International Journal of Communication*, 5, 773–787.
- Chang, C. L.-H. (2014). The interaction of political behaviors in information systems implementation processes-Structuration Theory. *Computers in Human Behavior*, 33, 79–91.
- Chatfield, A. T., & Reddick, C. G. (2018). The role of policy entrepreneurs in open



- government data policy innovation diffusion: An analysis of Australian Federal and State Governments. *Government Information Quarterly*, 35(1), 123–134.
- Chen, W., & Hirschheim, R. (2004). A paradigmatic and methodological examination of information systems research from 1991 to 2001. *Information Systems Journal*, 14(3), 197–235.
- Chin, W. W., Gopal, A., & Salisbury, W. D. (1997). Advancing the theory of adaptive Structuration: The development of a scale to measure faithfulness of appropriation. *Information Systems Research*, 8(4), 342–367.
- Chowdhury, S. N., & Dhawan, S. (2016). HDI based data ownership model for smart cities. In *2016 International Conference on Recent Trends in Information Technology, ICRTIT 2016* (pp. 1–5). IEEE.
- Chui, M., Farrell, D., & Jackson, K. (2014). How government can promote open data and help unleash over 3 million\$ in economic value. *Innovation in Local Government: Open Data and Information Technology*, 2, 4–23.
- Chun, S. A., Shulman, S., Sandoval, R., & Hovy, E. (2010a). Government 2.0: making connections between citizens, data and government. *Information Polity*, 15(1–2), 1–9.
- Citineews room. (2021a). Data from the Ghana AIDS Commission shows that as at december 2020, there were 346,120 persons living with HIV in Ghana. Retrieved November 10, 2021, from <https://www.facebook.com/citi973/posts/10158900659771107>.
- Citineews room. (2021b). More women have HIV in Ghana than men. Retrieved November 4, 2021, from <https://www.facebook.com/citi973/posts/10158906777881107>.
- Clarke, V., & Braun, V. (2018). Using thematic analysis in counselling and psychotherapy research: A critical reflection. *Counselling and Psychotherapy Research*, 18(2), 107–110.
- Clauss, T. (2017). Measuring business model innovation: Conceptualization, scale development and proof of performance. *Wiley Online Library*, (1), 385–403.
- Clegg, S. R. (1989a). *Framework of power*. Sage Publications, London.
- Clegg, S. R. (1989b). Radical devisions: Power, Discipline and organizations. *Organization Studies*, 10(1), 97–115.
- Coglianese, C. (2009). The transparency president? The Obama administration and open government. *Governance: An International Journal of Policy, Administration, and Institutions*, 22(4), 529–544.
- Collins, B. L., Fruth, L., Sessa, M., Council, E. S., Laird, E., & Campaign, D. Q. (2007). The right data to the right people at the right time : How interoperability helps merica's students succeed improving data-based decisionmaking through interoperability, (June), 1–12.
- Corbin, J. M., & Strauss, A. (1990). Grounded theory research: Procedures, canons, and evaluative criteria. *Qualitative Sociology*, 13(1), 3–21.
- Crusoe, J., Gebka, E., & Ahlin, K. (2020). Open government data from the perspective of information needs-A tentative conceptual model. In *In International Conference on Electronic Government* (pp. 250–261). Springer, Cham.



- Crusoe, J., Zuiderwijk, A., & Melin, U. (2020). Open government data systems: learning from a public utility perspective. In In: *Viale Pereira G. et al. (eds) Electronic Government. EGOV 2020. Lecture Notes in Computer Science*, (p. vol 12219.).
- Dahmm, H. (2020). *Using mobile Data for health monitoring: A case study of data sharing between Ghana Statistical Services , Vodafone Ghana , and Flowminder Foundation.*
- Dalton, R. J. (2008). Citizenship norms and the expansion of political participation. *Political Studies*, 56(1), 76–98.
- Darke, P., Shanks, G., & Broadbent, M. (1998). Successfully completing case study research: combining rigour, relevance and pragmatism. *Information Systems Journal*, 8(4), 273–289.
- Davies, T., & Perini, F. (2016). Researching the emerging impacts of open data ODDC conceptual framework. *Journal of Community Informatics*, 12(2 (Special issue on Open Data for Social Change and Sustainable Development)), 148–178.
- Dawes, S. S. (2010). Stewardship and usefulness: Policy principles for information-based transparency. *Government Information Quarterly*, 27(4), 377–383.
- Dawes, S. S. (2018). Interagency, 15(3), 377–394.
- Dawes, S. S., & Helbig, N. (2010). Information strategies for open government: Challenges and prospects for deriving public value from government transparency. *Lecture Notes in Computer Science (Including Subseries Lecture Notes in Artificial Intelligence and Lecture Notes in Bioinformatics)*, 6228 LNCS, 50–60.
- Dawes, S. S., & Helbig, N. C. (2015). *The value and limits of government information resources for policy informatics* (. In E. Jo). Routledge.
- Dawes, S. S., Vidiassova, L., & Parkhimovich, O. (2016a). Planning and designing open government data programs: An ecosystem approach. *Government Information Quarterly*, 33(1), 15–27.
- Dawes, S. S., Vidiassova, L., & Parkhimovich, O. (2016b). Planning and designing open government data programs: An ecosystem approach. *Government Information Quarterly*, 33(1), 15–27.
- de Beer, J. (2017). Ownership of open data: Governance options for agriculture and nutrition, 13. Retrieved from https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3015958.
- DeSanctis M.S., G. . P. (1994). Capturing the complexity in advanced technology use: Adaptive structuration theory. *Organization Science*, 5(2), 121–147.
- DeSanctis, G. (1989). Small group research in information systems: Theory and method. *The information systems research challenge: Experimental research methods*, 2, 53-82.
- DeSanctis, Gerardine, & Poole, M. S. (1994). Capturing the complexity in advanced technology use: Adaptive Structuration Theory. *Organization Science*, 5(2), 121–147.
- Desert Bloom Advisory. (2019). The odekro story: Empowering Ghanaians with accurate information on parliament. Retrieved from <https://desertbloomadvisory.com/2019/05/19/the-odekro-story-empowering-ghanaians-with-accurate-information-on-parliament/>.



- Development Gateway Inc. (2017). *Open contracting scoping study: Ghana*. Retrieved November 19, 2020, from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fdevelopmentgateway.org%2Fwp-content%2Fuploads%2F2020%2F10%2FOpen-Contracting-West-Africa-Ghana-Development-Gateway.pdf&clen=1286896&chunk=true.
- Donkor, J. (2019). Ghana open data initiative operational. Retrieved November 19, 2019, from <http://www.ghanaiantimes.com.gh/ghana-open-data-initiative-operational-this-month>
- Dow, G. K. (1988). Configuration and coactivational views of organizational structure. *The Academy of Management Review*, 13(4), 601–614.
- Dumais, S. A. (2002). Cultural capital, gender, and school success: The role of habitus. *Sociology of Education*, 75(1), 44.
- Duodo, S. (2019). Sefa Kyai's charities donates incubators to Tamale hospital. Retrieved June 18, 2020, from <https://www.graphic.com.gh/news/health/ghana-news-sefa-kayi-s-kokrokoo-charities-donates-incubators-to-tamale-hospital.html>.
- Durmusoglu, S. (2004). Open innovation: The new imperative for creating and profiting from technology. *European Journal of Innovation Management*, 7(4), 325–326.
- Easton, G. (2010). Critical realism in case study research. *Industrial Marketing Management*, 39(1), 118–128.
- Effah, J., & Nuhu, H. (2017). Institutional barriers to digitalization of government budgeting in developing countries: A case study of Ghana. *Electronic Journal of Information Systems in Developing Countries*, 82(1).
- Eisenhardt, K. M. (1989). Building theories from case study research. *The Academy of Management Review*, 14(4), 532–550.
- Ekow, L., Ernest, S.-M., Ashitey, N., Kwabena, A., Sarfo-Kantanka, S., Mensah, G., & Agblevor, E. A. (2017). *Report on the sixth parliament of the fourth Republic of Ghana*. Retrieved from http://citifmonline.com/wp-content/uploads/2017/01/odekro_6th_parliament_report.pdf.
- Englund, H., Gerdin, J., & Burns, J. (2017). A structuration theory perspective on the interplay between strategy and accounting: Unpacking social continuity and transformation. *Critical Perspectives on Accounting*.
- Esoko. (2018). Collect quality data in realtime. Retrieved June 2019, from <https://esoko.com/datacollection/>
- Esoko. (2019). Fighting climate change through farmer access to data. Retrieved May 27, 2021, from <https://esoko.com/portfolio/fighting-climate-change-through-farmer-access-to-data/>.
- Even, A., & Shankaranarayanan, G. (2009). Utility cost perspectives in data quality management. *Journal of Computer Information Systems*, 50(2), 127–135.
- Fairclough, N. (2009). Discourse analysis in organization studies: The case for critical realism. *Organization Studies*, 154(5), 84–90.



- Farmerline. (2013). Market-driven solutions that empower over 200,000 farmers. Retrieved August 21, 2018, from <https://mergdata.com/platform/>.
- Farmerline. (2019). Mergdata case studies. Retrieved November 21, 2019, from <https://mergdata.com/case-studies/>.
- Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, 5(1), 80–92.
- Ferro, E., & Osella, M. (2013). *Eight business model archetypes for PSI re-use." Open Data on the Web. In Workshop Shoreditch*. Retrived from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.w3.org%2F2013%2F04%2Fodw%2Fodw13_submission_27.pdf&clen=1726642&chunk=true
- Flynn, D. J., & Hussain, Z. (2004). Seeking legitimation for an information system: a preliminary process model. *Ecis*, 27(2004), 544–552.
- FoN Ghana. (2018). Open government partnernership: Local action plan. Retrieved on December 20 2019, from facebook.com/FoNGhana/photos/sekondi-takoradi-metropolitan-assembly-launches/2111901852217928/?_rdc=1&_rdr.
- Freeman, M. (2014). The hermeneutical aesthetics of thick description. *Qualitative Inquiry*, 20(6), 827–833.
- Frith, H., & Gleeson, K. (2004). Clothing and embodiment: men managing body image and appearance. *Psychology of Men and Masculinity*, 5(1), 40–48.
- Fuchs, C. (2003). Structuration theory and self-organization. *Systemic Practice and Action Research*, 16(2), 133–167.
- Fuger, S. (2018). Tales from the field: Data collection for LEAP (Livelihood Empowerment Against Poverty). Retrieved November 20, 2019, from <https://esoko.com/tales-field-data-collection-leap-livelihood-empowerment-poverty/>.
- Galliers, R. D., & Land, F. F. (1997). Qualitative research in information systems. *Mis Q*, 21(June), 241–242.
- Ganapati, S., & Reddick, C. G. (2012). Open e-government in U.S. state governments: Survey evidence from Chief Information Officers. *Government Information Quarterly*, 29(2), 115–122.
- Gao, Y., Janssen, M., & Zhang, C. (2021). Understanding the evolution of open government data research: towards open data sustainability and smartness. *International Review of Administrative Sciences*, 0020853211009955.
- Garcia, R., Wigger, K., & Hermann, R. R. (2019). Challenges of creating and capturing value in open eco-innovation: Evidence from the maritime industry in Denmark. *Journal of Cleaner Production*, 220, 642–654.
- Gascó-Hernández, M., Martin, E. G., Reggi, L., Pyo, S., & Luna-Reyes, L. F. (2018). Promoting the use of open government data: Cases of training and engagement. *Government Information Quarterly*, 35(2), 233–242.
- Gebka, E., Clarinval, A., Simonofski, A., & Crusoe, J. (2019). Generating value with open



- government data: Beyond the programmer. In *Proceedings-International Conference on Research Challenges in Information Science* (Vol. 2019-May, pp. 2019–2020). IEEE.
- Geeling, S., Brown, I., & Weimann, P. (2016). Information systems and culture-a systematic hermeneutic literature review. *CONF-IRM 2016 Proceedings*, 37(May), 1–13.
- Geospatial World. (2019). Geospatial data for development agendas takes centrestage at first Africa geospatial data and internet conference. Retrieved November 19, 2019, from <https://www.geospatialworld.net/news/geospatial-data-for-development-agendas-takes-centrestage-at-first-africa-geospatial-data-and-internet-conference/>.
- Ghana Business News (GBN). (2019). Ghana government to appoint information commissioner for RTI law. Retrieved November 19, 2019, from <https://www.ghanabusinessnews.com/2019/09/27/ghana-government-to-appoint-information-commissioner-for-rti-law/>.
- Ghana Open Data Initiative. (2012). Ghana open data initiative. Retrieved August 1, 2018, from <http://data.gov.gh/>.
- Ghana Statistical Service. (2017). *Data production for SDG indicators in Ghana*. Available from chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww2.statsghana.gov.gh%2Fdocfiles%2FSDGs%2FData%2520Roadmap%2520Forum-%2520Concept%2520Note.pdf&cflen=1090479&chunk=true
- Ghana Statistical Service. (2021). History. Retrieved May 4, 2020, from <https://statsghana.gov.gh/aboutgss.php?category=MzQzMDg4NDY0Ljg5NDU=/webstats/r410p12p51>.
- GhanaWeb. (2019). RTI: Government begins implementation process ahead of passage. Retrieved June 25, 2019, from <https://www.ghanaweb.com/GhanaHomePage/NewsArchive/RTI-Government-begins-implementation-process-ahead-of-passage-Oppong-Nkrumah-732894>.
- Giddens, A. (1979). *Central problems in social theory*. Berkeley: University of California Press.
- Giddens, Anthony. (1984). *The Constitution of Society*. University of califonia Press, Los Angeles CA.
- Gilbert, D., Balestrini, P., & Littleboy, D. (2004). Barriers and benefits in the adoption of e-government. *International Journal of Public Sector Management*, 17(4), 286–301.
- Gill, T. G. (2011). *Informing with the Case Method: A Guide to Case Method Research, Writing & Facilitation*. Informing Science.
- Ginsberg, W. R. (2013). The Obama Administration's open government initiative: Issues for congress. *Government Transparency and Secrecy: Measures, Access, and Policies*, 85–129.
- Global Partnership for Sustainable Development. (2018). Global Partnership for Sustainable Development: Ghana National Data Roadmap Process. Available from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwebdeploy.statsghana.gov.gh%2Fdocfiles%2FSDGs%2FData%2520and%2520the%2520SDGs%2520in%2520Ghana_Final2.pdf&cflen=1324652&chunk=true.



- GODI Secretariat. (2014). Ghana open data initiative: *Action plan*. Available from: https://www.opengovpartnership.org/wp-content/uploads/2017/11/Ghana_Action-Plan_2017-2019.docx.
- Goldkuhl, G. (2012). Pragmatism vs interpretivism in qualitative information systems research. *European Journal of Information Systems*, 21(2), 135–146.
- Goldstein, A. E., & Reiboldt, W. (2004). The multiple roles of low income, minority women in the family and community. *The Qualitative Report*, 9(2), 241–265.
- Golub, K., & Lund, A. (2021). Why open government data? The case of a Swedish municipality. *Journal of Data and Information Science*, 6(1), 120–138.
- Gonzalez-Zapata, F., & Heeks, R. (2015). The multiple meanings of open government data: Understanding different stakeholders and their perspectives. *Government Information Quarterly*, 32(4), 441–452.
- González-zapata, F., & Heeks, R. (2013). The Challenges of Institutionalising Open Government Data: A Historical Perspective of Chile's OGD initiative and Digital Government Institutions. In *The Social Dynamics of Open Data* (pp. 13–34).
- González-Zapata, F., & Heeks, R. (2015). Understanding Multiple Roles of Intermediaries in Open Government Data. *13th International Conference on Social Implications of Computers in Developing Countries*, (May 2015), 1–10.
- Grange, C., & Benbasat, I. (2010). Online social shopping: The functions and symbols of design artifacts. In *Proceedings of the Annual Hawaii International Conference on System Sciences* (pp. 1–10). IEEE.
- Graphic.com.gh. (2020). Covid-19 death figures are being 'Massaged' - Occupy Ghana. Retrieved June 23, 2020, from <https://www.graphic.com.gh/news/general-news/covid-19-death-figures-are-being-massaged-occupy-ghana.html>.
- Graphic.com. (2021). Release information to public in line with RTI Act-Information Ministry. Retrieved April 26, 2021, from <https://www.peacefmonline.com/pages/local/news/202104/443373.php>.
- Greenhalgh, T., & Stones, R. (2010). Theorising big IT programmes in healthcare: Strong structuration theory meets actor-network theory. *Social Science and Medicine*, 70(9), 1285–1294.
- Gregor, S. (2006). The nature of theory in information systems. *MIS Quarterly*, 30(3), 611–642.
- Greve, A., & Salaff, J. W. (2003). Social networks and entrepreneurship. *Entrepreneurship Theory and Practice*, 28(1), 1–22.
- Guba, E. G. (1990). *The Alternative Paradigm Dialog*. (ed. T. P. D. E. G. Guba, Ed.). Sage, Newbury Park, CA.
- Guba, Egon G., & Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In *Handbook of Qualitative Research* (pp. 105–117).
- Gulati, R. (1995). Social structure and alliance formation patterns : A Longitudinal Analysis. *Administrative Science Quarterly*, 40(4), 619–652.
- Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organization



- in a developing country: An empirical study. *Journal of Strategic Information Systems*, 17(2), 140–154.
- Hanks, W. F. (2005). Pierre Bourdieu and the practices of language. *Annual Review of Anthropology*, 34(1), 67–83.
- Hansen, E. L. (1995). Entrepreneurial networks and new organization growth. *Entrepreneurship Theory and Practice*, 19(4), 7–19.
- Hansen, R. E. (1995). Teacher socialization in technological education. *Journal of Technology Education*, 6(2), 34–45.
- Hanseth, O., Aanestad, M., & Berg, M. (2004). Guest editors' introduction: Actor-network theory and information systems. What's so special? *Information Technology & People*, 17(2), 116–123.
- Harindranath, G., Dyerson, R., & Barnes, D. (2008). ICT Adoption and Use in UK SMEs : a Failure of Initiatives ? *Electronic Journal Information Systems Evaluation*, 11(2), 91–96.
- Harrison, T. M., Guerrero, S., Burke, G. B., Cook, M., Cresswell, A., Helbig, N., ... Pardo, T. (2012). Open government and e-government: Democratic challenges from a public value perspective. *Information Polity*, 17(2), 83–97.
- Harrison, T. M., & Sayogo, D. S. (2014). Transparency, participation, and accountability practices in open government: A comparative study. *Government Information Quarterly*, 31(4), 513–525.
- Hart, D. (2002). Ownership as an Issue in Data and Information Sharing: a philosophically based review. *Australasian Journal of Information Systems*, 10(1), 23–29.
- Hartley, J., Alford, J., Knies, E., & Douglas, S. (2017). Towards an empirical research agenda for public value theory. *Public Management Review*, 19(5), 670–685.
- Haugh, H. (2007). Community-led social venture creation. *Entrepreneurship Theory and Practice*, 31(2), 161–182.
- Haugh, H. (2012). The importance of theory in social enterprise research. *Social Enterprise Journal*, 8(1), 7–15.
- Hekman, S. (1990). Hermeneutics and the Crisis of Social Theory: A Critique of Giddens's Epistemology'. *Anthony Giddens: Consensus and Controversy*, 155–165.
- Helbig, N., Nakashima, M., & Dawes, S. S. (2012). Understanding the value and limits of government information in policy informatics: a preliminary exploration. In *Proceedings of the 13th annual international conference on digital government research* (pp. 291–293).
- Henderson, S., & Yeow, J. (2012). iPad in education: A case study of iPad adoption and use in a primary school. *2012 45th Hawaii International Conference on System Sciences*, 78–87.
- Henninger, M. (2018). Reforms to counter a culture of secrecy: Open government in Australia. *Government Information Quarterly*, 35(3).
- Hielkema, H., & Hongisto, P. (2013). Developing the Helsinki Smart City: The Role of Competitions for Open Data Applications. *Journal of the Knowledge Economy*, 4(2),



- 190–204. <https://doi.org/10.1007/s13132-012-0087-6>.
- Hofstede, G. H. (1980a). *Culture's consequences: International differences in work-related values*. Beverly: University of California: Sage Publication, Inc.
- Hofstede, G. H. (1980b). Culture and organizations. *International Studies of Management & Organization*, 10(4), 15–41.
- Hofstede, G. H. (1998). Attitude, values and organizational culture: Disentangling the concepts. *Organization Studies*, 19(3), 177–492.
- Honoré, A. M. (2013). Ownership. In *Readings in the philosophy of law* (pp. 563–564). Routledge.
- Hopf, Y. M., Bond, C. B., Francis, J. J., Haughney, J., & Helms, P. J. (2014). Linked health data for pharmacovigilance in children: Perceived legal and ethical issues for stakeholders and data guardians. *BMJ Open*, 4(2), 1–7.
- Houston, S. (2002). Reflecting on habitus, field and capital: Towards a culturally sensitive social work. *Journal of Social Work*, 2(2), 149–167.
- Huang, Z., & Brooks, L. (2011). Credibility and usability evaluation of e-governments: Heuristic evaluation approach. In *Transforming Government Workshop*, 7(1), 1–15.
- Hussain, Z., & Flynn, D. (2004). Importance of legitimization systems development. *Innovations Through Information Technology, Vols 1 and 2*, 561–564.
- Hussain, Zahid, Taylor, A., & Flynn, D. (2004). A case study of the process of achieving legitimization in information systems development. *Journal of Information Science*, 30(5), 408–417.
- Hybels, R. C. (1995). On legitimacy, legitimation, and organizations: A critical review and integrative theoretical model. *Academy of Management Proceedings*, (1).
- Hyde, K. F. (2000). Recognising deductive processes in qualitative research. *Qualitative Market Research: An International Journal*, 3(2), 82–90.
- Ibrahim, A. (2019). Workshop on Roadmap to RTI Implementation Opens in Accra. Retrieved from <https://www.myjoyonline.com/politics/2019/may-30th/workshop-on-roadmap-for-rti-implementation-opens-in-accra.php>.
- Initiative International Aid Transparency. (2018). IATI and UNDP Data Awareness Workshop. Retrieved November 19, 2019, from <https://iatistandard.org/en/events/africa-open-data-iati-workshops-and-hackathon/>.
- Janssen, M., & Zuiderwijk, A. (2014). Infomediary business models for connecting open data providers and users. *Social Science Computer Review*, 35(5), 694–711.
- Janssen, Marijn, Charalabidis, Y., & Zuiderwijk, A. (2012a). Benefits, adoption barriers and myths of open data and open government. *Information Systems Management*, 29(4), 258–268.
- Janssen, Marijn, Matheus, R., Longo, J., & Weerakkody, V. (2017). Transparency-by-design as a foundation for open government. *Transforming Government: People, Process and Policy*, 11(1).
- Janssen, Marijn, & Zuiderwijk, A. (2014). Infomediary Business Models for Connecting



- Open Data Providers and Users. *Social Science Computer Review*, 32(5), 694–711.
- Jarrahi, M. H. (2010). A structurational analysis of how course management systems are used in practice. *Behaviour and Information Technology*, 29(3), 257–275.
- Jawitz, J. (2009). Learning to assess in the academic workplace: Case study in the natural sciences. *South African Journal of Higher Education*, 22(5), 1006–1018.
- Jenssen, J. I., & Greve, A. (2002). Does the degree of redundancy in social networks influence the success of business start-ups? *International Journal of Entrepreneurial Behaviour & Research*, 8(5), 254–267.
- Jenssen, J. I., & Koenig, H. F. (2002). The effect of social networks on resource access and business start-ups. *European Planning Studies*, 10(8), 1039–1046.
- Jetzek, T., Avital, M., & Bjorn-Andersen, N. (2014a). Data-driven innovation through open government data. *Journal of Theoretical and Applied Electronic Commerce Research*, 9(2), 100–120.
- Jetzek, T., Avital, M., & Bjorn-Andersen, N. (2014b). Data-driven innovation through open government data. *Journal of Theoretical and Applied Electronic Commerce Research*, 9(2), 15–16.
- Jetzek, T., Avital, M., & Bjørn-Andersen, N. (2014). Generating sustainable value from open data in a sharing society. *IFIP Advances in Information and Communication Technology*, 429, 62–82.
- Jetzek, T., Avital, M., & Bjørn-Andersen, N. (2016). Generating value from open government data. *ICIS 2013 Proceedings-International Conference on Information Systems*, (July 2016), 1737–1756.
- Jones, M., & Karster, H. (2008). Gidden's structuration theory and information systems research. *MIS Quarterly*, 32(1), 127–157.
- Jørgensen, T. B., & Rutgers, M. R. (2015). Public values: Core or confusion? Introduction to the centrality and puzzlement of public values research. *American Review of Public Administration*, 45(1), 3–12.
- Journalism for Human Rights. (2013). Pioneering data journalism in Ghana. Retrieved June 17, 2020, from <https://jhr.ca/pioneering-data-journalism-in-ghana>.
- Juran, J., & Godfrey, A. B. (1999). Quality handbook. *Republished McGraw-Hill*, 173(8), 34–51.
- Jurison, J. (1996). The temporal nature of IS benefits: A longitudinal study. *Information and Management*, 30(2), 75–79.
- Kabanda, S. (2011). “E-Commerce institutionalization is not for us”: SMEs perception of e-Commerce in Tanzania. *The African Journal of Information Systems*, 3(1), 1.
- Kabanda, S., & Brown, I. (2017). A structuration analysis of Small and Medium Enterprise (SME) adoption of E-Commerce: The case of Tanzania. *Telematics and Informatics*, 34(4), 118–132.
- Kabanda, S. K., & Brown, I. (2015). E-commerce enablers and barriers in Tanzanian small and medium enterprises. *Electronic Journal of Information Systems in Developing*



- Countries*, 67(1), 1–24.
- Kapitan, T. (1992). Peirce and the Autonomy of Abductive Reasoning. *Erkenntnis*, 37(1), 1–26.
- Kaplan, B., & Duchon, D. (1988). Combining qualitative and quantitative information systems: A Case Study. *MIS Quarterly*, 12(4), 571–586.
- Karlsson, F., Holgersson, J., Söderström, E., & Hedström, K. (2012). Exploring user participation approaches in public e-service development. *Government Information Quarterly*, 29(2), 158–168.
- Karunasena, K., & Deng, H. (2010). Exploring the public value of e-government: An empirical study from Sri Lanka. *Proceedings of Bled EConference ETrust: Implications for the Individuals. Enterprises and Society, Bled.*, 286–300.
- Karunasena, K., & Deng, H. (2012). Critical factors for evaluating the public value of e-government in Sri Lanka. *Government Information Quarterly*, 29(1), 76–84.
- Kassen, M. (2013). A promising phenomenon of open data: A case study of the Chicago open data project. *Government Information Quarterly*, 30(4), 508–513.
- Katz, J., & Gartner, W. B. (1988). Properties of emerging organizations. *Academy of Management Review*, 31(3), 429–441.
- Khan, S. M., & Hamlen, K. W. (2012). AnonymousCloud: A data ownership privacy provider framework in cloud computing. *Proc. of the 11th IEEE Int. Conference on Trust, Security and Privacy in Computing and Communications, TrustCom-2012-11th IEEE Int. Conference on Ubiquitous Computing and Communications, IUCC-2012*, 170–176.
- Khan, Z., Pervez, Z., & Ghafoor, A. (2014). Towards cloud based smart cities data security and privacy management. *Proceedings-2014 IEEE/ACM 7th International Conference on Utility and Cloud Computing, UCC 2014*. IEEE.
- Khurshid, M. M., Zakaria, N. H., Rashid, A., Ahmad, M. N., Arfeen, M. I., & Faisal Shehzad, H. M. (2020). Modeling of open government data for public sector organizations using the potential theories and determinants-a systematic review. *Informatics*, 7(3), 24.
- Kim, W. (2002). On three major holes in data warehousing today. *Journal of Object Technology*, 1(4), 39–47.
- Klein, H. K., & Myers, M. D. (1999a). A set of principles for conducting and evaluating interpretive field studies in information systems. *MIS Quarterly: Management Information Systems*, 23(1), 67–94.
- Klein, H. K., & Myers, M. D. (1999b). A set of principles for conducting and evaluating interpretive field studies in Information Systems. *MIS Quarterly*, 23(1), 67. <https://doi.org/10.2307/249410>.
- Krauss, S. E. (2005). Research paradigms and meaning making : A Primer. *The Qualitative Report*, 10(4), 758–770.
- Kubler, S., Robert, J., Neumaier, S., Umbrich, J., & Le Traon, Y. (2018). Comparison of metadata quality in open data portals using the Analytic Hierarchy Process. *Government Information Quarterly*, 35(1), 13–29.



- Kučera, J., Chlapek, D., & Nečaský, M. (2013). *Open government data Catalogs: Current approaches and quality perspective: In a technology-enabled innovation for democracy, government and governance*. Springer, Berlin, Heidelberg.
- Kucera, J., & Chlapek, D. (2014). Benefits and risks of open government data. *Journal of Systems Integration*, 30–41.
- Kvale, S. (2006). Dominance through interviews and dialogues. *Qualitative Inquiry*, 12(3), 480–500.
- La Pelle, N. (2004). Simplifying qualitative data analysis using penral Purpose software tools. *Field Methods*, 16(1), 85–108.
- Lack, S., Noddings, R., & Hewlett, S. (2011). Men's experiences of rheumatoid arthritis: An inductive thematic analysis. *Musculoskeletal Care*, 9(2), 102–112.
- Lee, A. S. (1991a). Integrating positivist and interpretive approaches to organizational research. *Organization Science*, 2(4), 342–365.
- Lee, G., & Kwak, Y. H. (2012). An open government maturity model for social media-based public engagement. *Government Information Quarterly*, 29(4), 492–503.
- Lempert, R. J. (2002). A new decision sciences for complex systems. In *Proceedings of the National Academy of Sciences of the United States of America* (Vol. 99, pp. 7309–7313).
- Limayem, M., Hirt, S., & Cheung, C. M. K. (2007). How habit limits the predictive power of Intention. *MIS Quarter*, 14(2), 1–14.
- Linstead, S., & Grafton-Small, R. (1992). On reading organizational culture. *Organization Studies*, 13(3), 331–355.
- Lnenicka, M. (2015). An in-depth analysis of open data portals as an emerging public e-service. *International Journal of Social, Education, Economics and Management Engineering*, 9(2), 589–599.
- Loebbecke, C., & Picot, A. (2015). Reflections on societal and business model transformation arising from digitization and big data analytics: A research agenda. *The Journal of Strategic Information Systems*, 24(3), 149–157.
- Lourenço, R. P. (2016). Evidence of an open government data portal impact on the public sphere. *International Journal of Electronic Government Research*, 12(3), 21–36.
- Luna-Reyes, L. F., Gil-Garcia, J. R., & Romero, G. (2012). Towards a multidimensional model for evaluating electronic government: Proposing a more comprehensive and integrative perspective. *Government Information Quarterly*, 354–334(29), 3.
- Lyytinen, K. J., & Ngwenyama, O. K. (1992). What does computer support for cooperative work mean? a structurational analysis of computer supported cooperative work. *Accounting, Management and Information Technologies*, 2(1), 19–37.
- Máchová, R., & Lněnička, M. (2017). Evaluating the quality of open data portals on the national level. *Journal of Theoretical and Applied Electronic Commerce Research*, 12(1), 21–41.
- MacKay, B., & Tambeau, P. (2013). A structuration approach to scenario praxis. *Technological Forecasting and Social Change*, 80(4), 673–686.



- Magalhaes, G., & Roseira, C. (2017). Open government data and the private sector: An empirical view on business models and value creation. *Government Information Quarterly*, (September 2015), 1–10.
- Malgieri, G., & Custers, B. (2018). Pricing privacy-the right to know the value of your personal data. *Computer Law and Security Review*, 34(2), 289–303.
- Marfo, C. K. (2018). Opportunities and challenges of data journalism in Ghana. Retrieved November 20, 2019, from <https://www.myjoyonline.com/opinion/2018/september-14th/opportunities-and-challenges-of-data-journalism-in-ghana.php>
- Marshall, S. P. (2009). Giddens's structuration theory and information systems research. *MIS Quarterly*, 33(3), 583–587.
- Martinson, R. (1979). The open government principle: Applying the right to know under government constitution. *Hofstra Law Review*, 7(2), 243–258.
- Mashhadi, A., Kawsar, F., & Acer, U. G. (2014). Human data interaction in IoT: The ownership aspect. In *2014 IEEE World Forum on Internet of Things, WF-IoT 2014* (pp. 159–162). IEEE.
- McCall, L. (1994). Review Reviewed Work (s): Pierre Bourdieu . by Richard Jenkins. *Contemporary Sociology*, 23(2), 326–327.
- McCoy, S., Galletta, D. F., & King, W. R. (2005). Integrating national culture into IS research: The need for current individual level measures. *Communications of the Association for Information Systems*, 15(1), 12.
- McDermott, P. (2010). Building open government. *Government Information Quarterly*, 27(4), 401–413.
- McGregor, E. B. (1997). Creating public value: Strategic management in movernment, Mark H. Moore. *Journal of Policy Analysis and Management*, 16(1), 153–161.
- McKnight, Vivek Choudhury, C. K. (2002). Developing and validating trust measure for e-Commerce: An Integrative Typology. *Information System Research.*, 13(3)(3), 334–359.
- Meijer, A. (2013). Understanding the complex dynamics of transparency. *Public administration review*, 73, 429–439.
- Mekonnen, S. M., & Wubishet, Z. S. (2016). An institutional perspective to understand FOSS adoption in public sectors: Case studies in Ethiopia and India. *American Journal of Information Systems*, 4(2), 32–44.
- Mergel, I., & Desouza, K. (2013). Implementing open innovation in the public sector: The case of challenge. gov. *Public Administration Review*, 73(6), 882–890.
- MFWA. (2019). MFWA, RTI calition to convene public forum on Ghana's RTI Law. Retrieved November 19, 2019, from <http://www.mfwa.org/16154/>.
- Miller, K. D., & Waller, H. G. (2003). Scenarios, real options and integrated risk management. *Long Range Planning*, 36(1), 93–107.
- Mingers, J. (2001). Combining IS research methods: Toowards a pluralist methodology. *MIS Quarterly*, 12(3), 240–259.
- Miranda, S. M., Kim, I., & Summers, J. D. (2015). Jamming with social media: How



- cognitive structuring of organization vision facets affects IT innovation diffusion. *MIS Quarterly*, 39(3), 591–614.
- Modern Ghana. (2019). Parliament finally passes Right to Information Act after two decades. Retrieved on December 16 2019, from <https://www.modernghana.com/news/923171/parliament-finally-passes-rti-bill-after-two-decad.html>
- Monge, P. R., Fulk, J., Kalman, M. E., Flanagan, A. J., Parnassa, C., & Rumsey, S. (1998). Production of collective action in alliance-based interorganizational communication and information systems. *Organization Science*, 9(3), 411–433.
- Moore, D. R. J. (2011). Structuration theory: The contribution of Norman Macintosh and its application to emissions trading. *Critical Perspectives on Accounting*, 22(2), 212–227.
- Moore, M H. (1995). Creating public value: Strategic management in government. Harvard University Press.
- Moore, Mark H. (2014). Mark H. Moore-Public value accounting-Establishing the philosophical bias. *Public Administration Review*, 74(4), 465–477.
- Morrison, K. (2005). Structuration theory, habitus and complexity theory: elective affinities to old wine in new bottles? *British Journal of Sociology of Education*, 26(3), 311–326.
- Mungai, P., & Van Belle, J. (2017). Understanding the Kenya open data initiative trajectory from an actor-network perspective. In *African Conference on Information Systems & Technology (ACIST)* (pp. 1–7).
- Mungai, P. W. (2018). Causal mechanisms and institutionalisation of open government data in Kenya. *Electronic Journal of Information Systems in Developing Countries*, 84(6), 1–13.
- Musila, J. W., & Yiheyis, Z. (2015). The impact of trade openness on growth: The case of Kenya. *Journal of Policy Modeling*, 37(2), 342–354.
- Mutuku, L., & Mahihu, C. (2014a). A suggested framework for impactful open data applications in developing countries. *Proceedings of the 8th International Conference on Theory and Practice of Electronic Governance-ICEGOV '14*, 498–499.
- Mutuku, L., & Mahihu, C. (2014b). Understanding the impacts of Kenya open data applications and services, 1–57. iHub Research, 2012 Nairobi.
- Myers, M. D. (2009). *Qualitative Research in Business and Management*. London SAGE Publications.
- Myers, Michael D. (1997). Qualitative research in information systems. *Management Information Systems Quarterly*, 21(June), 1–18.
- MyJoyOnline. (2017). Ghana: more pressure on government to pass RTI bill. Retrieved December 14, 2019, from <https://www.modernghana.com/news/809925/ghana-more-pressure-on-government-to-pass-rti.html>.
- Ngwenyama, O., & Nørbjerg, J. (2010). Software process improvement with weak management support: An analysis of the dynamics of intra-organizational alliances in IS change initiatives. *European Journal of Information Systems*, 19(3), 303–319.
- Oates, B. (2005). Researching information systems and computing. California: Sage.



Publications Inc.

- Odekro. (2016). *Absenteeism rates in Ghana's sixth parliament of the fourth republic introduction* (Vol. 97). Available from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=http%3A%2F%2Fwww.odekro.org%2FImages%2FUploads%2F121715_absenteeism_report.pdf&cflen=372204&chunk=true.
- Ogden, D., & Rose, R. A. (2005a). Using Giddens's structuration theory to examine the waning participation of African Americans in baseball. *Journal of Black Studies*, 35(4), 225–245.
- Ogden, D., & Rose, R. A. (2005b). Using Giddens's structuration theory to examine the waning participation of African Americans in baseball. *Journal of Black Studies*, 35(4), 225–245.
- Ohemeng, F. L. K., & Ofosu-Adarkwa, K. (2015). One way traffic: The open data initiative project and the need for an effective demand side initiative in Ghana. *Government Information Quarterly*, 32(4), 419–428.
- Ojo, A., Curry, E., & Zeleti, F. A. (2015). A tale of open data innovations in five smart cities. *Proceedings of the Annual Hawaii International Conference on System Sciences, 2015-March*, 2326–2335.
- Okamoto, K. (2016). What is being done with open government data? An exploratory analysis of public uses of New York City open data. *Webology*, 13(1).
- Open Government Partnership (2021). Republic of Ghana open government 4th national action October 2021. Available from: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/viewer.html?pdfurl=https%3A%2F%2Fwww.opengovpartnership.org%2Fwp-content%2Fuploads%2F2020%2F12%2FOGP-2021-Work-Plan_Final_December-2020.pdf&cflen=2105804&chunk=true.
- Orlikowski, W. J. (2000). Using technology and constituting structures: A practice lens for studying technology in organizations. *Organization Science*, 11(4), 404–428.
- Orlikowski, W. J., & Baroudi, J. J. (1991). Studying information technology in organizations: Research approaches and assumptions. *Information Systems Research*, 2(1), 1–28.
- Orlikowski, W. J., & Iacono, C. S. (2001). Research commentary: Desperately seeking the “IT” in IT research-A call to theorizing the IT artifact. *Information Systems Research*, 12(2), 121–134.
- Orlikowski, W. J., & Jack J. Baroudi. (1991). Studying information technology in organizations : Research approaches and assumptions. *Institute of Operations Research and the Management Science*, 2(1), 1–28.
- Orlikowski, W. J., & Robey, D. (1991a). Information technology and the structuring of organisations. *Information Systems Research*, 2(2), 143–169.
- Orlikowski, W. J., & Robey, D. (1991b). Information technology and the structuring of organizations. *Information Systems Research*, 2(2), 143–169.
- Parasie, S., & Dagiral, E. (2013). Data-driven journalism and the public good: “Computer-assisted-reporters” and “programmer-journalists” in Chicago. *New Media and Society*, 15(6), 853–871.



- Parliament, G. (2021). Address on open government partnership by Hon. Emmanuel Kwasi Bedzrah. Retrieved June 10, 2021, Available from: <https://www.parliament.gh/news?CO=127>
- Patel, H., & Jacobson, D. (2008). Factors influencing citizen adoption of e-government: A review and critical assessment. In *ECIS* (pp. 1058–1069).
- Patokorpi, E., & Ahvenainen, M. (2009). Developing an abduction-based method for futures research. *Futures*, 41(3), 126–139.
- Pauwels, P., De Meyer, R., & Van Campenhout, J. (2013). Design thinking support: Information systems versus reasoning. *Design Issues*, 29(2), 42–59.
- Payne, G., & Payne, J. (2004). *Key concepts in social research*. SAGE Publications.
- Pehlke, T. A., Hennon, C. B., Radina, M. E., & Kuvalanka, K. A. (2009). Does father still know best? An inductive thematic analysis of popular TV sitcoms. *fathering: A Journal of Theory, Research, and Practice about Men as Fathers*, 7(2), 114–139.
- Peirce, S. (1931). *Collected Papers of Charles Sanders Peirce*. (C. H. AND & P. W. V. I, Eds.), *America*. Cambridge harvard university press.
- Pipino, L. L., Lee, Y. W., & Wang, R. Y. (2002). Data quality assessment. *Communications of the ACM*, 45(4), 211–218.
- Popper, K. (2005). *The Logic of Scientific Discovery*. *New Yorker*. Routledge
- Popper, K. R. (1959). *The Logic of Scientific Discovery*. Rev. edn. 1980. Unwin Hyman Inc. 1990.
- Pozzebon, M., & Pinsonneault, A. (2005a). Challenges in conducting empirical work using structuration theory: Learning from IT research. *Organization Studies*, 26(9), 1353–1376.
- Pozzebon, M., & Pinsonneault, A. (2005b). Challenges in conducting empirical work using structuration theory: Learning from IT research. *Organization Studies*, 26(9), 1353–1376.
- Prior, L. (2008). Repositioning documents in social research. *Sociology*, 42(5), 821–836.
- Public Sector Reform Secretariate. (2016a). *The open government partnership initiative, national action plan for Ghana*. Retrieved from [https://www.opengovpartnership.org/sites/default/files/Ghana Plan 3.pdf](https://www.opengovpartnership.org/sites/default/files/Ghana%20Plan%203.pdf).
- Pugh, S. A. (2016). Global open data index-Rwanda insight. Retrieved March 12, 2018, from <https://blog.okfn.org/2015/12/09/global-open-data-index-rwanda/>
- Purwanto, A., Zuiderwijk, A., & Janssen, M. (2020a). Citizen engagement with open government data: Lessons learned from Indonesia's presidential election. *Transforming Government: People, Process and Policy*.
- Purwanto, A., Zuiderwijk, A., & Janssen, M. (2020b). Citizens' trust in open government data: A quantitative study about the effects of data quality, system quality and service quality. In *In The 21st Annual International Conference on Digital Government Research* (pp. 310–318).
- Ranson, S., Hinings, B., & Greenwood, R. (1980). The structuring of organizational



- structures. *Administrative Science Quarterly*, 25(1), 1–17.
- Rayner, S. (2011). Researching style : Epistemology , paradigm shifts and research interest groups. *Learning and Individual Differences*, 21(3), 255–262.
- Robinson, D. G., Yu, H., Zeller, W., & Felten, E. (2009). Government data and the invisible hand. *Yale Journal of Law & Technology*, 11, 160–175.
- Rose, J., & Hackney, R. (2002). Towards a structurational theory of information systems: A substantive case analysis. In *Proceedings of the 36th Annual Hawaii International Conference on System Sciences, HICSS 2003* (p. 9 pp.). IEEE.
- Rose, Jeremy. (1998). Evaluating the contribution of structuration theory to the information systems discipline. *6th European Conference on Information Systems*, 910–924.
- Rose, Jeremy, & Jones, M. (2005). The double dance of agency : a socio-theoretic account of how machines and humans interact. *Systems, Signs & Actions*, 1(1), 19–37.
- Rose, Jeremy, & Lewis, P. (2001). Using structuration theory in action research: An intranet development project. *IFIP Advances in Information and Communication Technology*, 66, 273–296.
- Rose, Jeremy, & Scheepers, R. (2001). Structuration theory and information system development-frameworks for practice. *Ecis*, 217–231.
- Rottman, J. W. (2008). Successful knowledge transfer within offshore supplier networks: A case study exploring social capital in strategic alliances. *Journal of Information Technology*, 23(1), 31–43.
- Rowe, F. (2014). What Literature Review is not: Diversity, Boundaries and Recommendations. *European Journal of Information Systems*, 23, 241–225.
- Ruijter, E., Grimmelikhuijsen, S., & Meijer, A. (2017a). Open data for democracy: Developing a theoretical framework for open data use. *Government Information Quarterly*, 34(1), 45–52.
- Ruijter, E., Grimmelikhuijsen, S., & Meijer, A. (2017b). Open data for democracy: Developing a theoretical framework for open data use. *Government Information Quarterly*, 34(1), 45–52.
- Ruppel, C. P., & Harrington, S. J. (2001). Sharing knowledge through intranets: A study of organizational culture and intranet implementation. *IEEE Transactions on Professional Communication*, 44(1), 37–52.
- Rust, R. T., & Lemon, K. N. (2001). E-service and the consumer. *International Journal of Electronic Commerce*, 5(3), 85–101.
- Sabblah, E. (2019). Data upload challenge and hackathon. Retrieved November 20, 2019, from <https://mobilewebghana.org/2019/03/21/data-upload-challenge-and-hackathon/>.
- Sadik, S. (2019). The state of open data in Ghana. Retrieved November 20, 2019, from <http://sadik.goifnetwork.org/2019/the-state-of-open-data-in-ghana>
- Sáez Martín, A., Rosario, A. H. De, & Pérez, M. D. C. C. (2016). An international analysis of the quality of open government data portals. *Social Science Computer Review*, 34(3), 298–311.



- Safarov, I., Meijer, A., & Grimmelikhuijsen, S. (2017). Utilization of open government data: A systematic literature review of types, conditions, effects and users. *Information Polity*, 22(1), 1–24.
- Sapsed, J., Grantham, A., & DeFillippi, R. (2007). A bridge over troubled waters: Bridging organisations and entrepreneurial opportunities in emerging sectors. *Research Policy*, 36(9), 1314–1334.
- Sarker, S., Lau, F., & Sahay, S. (2000). Using an adapted grounded theory approach for inductive theory building about virtual team development. *Data Base for Advances in Information Systems*, 32(1), 38–56.
- Sarker, S., & Sahay, S. (2003). Understanding virtual team development: An interpretive study. *Journal of the Association for Information Systems*, 4(1), 1–38.
- Saxena, S. (2018). Summarizing the decadal literature in open government data (OGD) research: a systematic review. *Foresight*.
- Saxena, S., & Muhammad, I. (2018). Barriers to use open government data in private sector and NGOs in Pakistan. *Information Discovery and Delivery*, 46(1).
- Schalkwyk, François van, Cañares, M., Chattapadhyay, S., & Andrason, A. (2015). *Open data intermediaries in developing countries*.
- Schnelker, D. L. (2006). The student-as-bricoleur : Making sense of research paradigms. *Teaching and Teacher Education*, 22, 42–57.
- School of Data. (2015). Who we are. Retrieved November 20, 2019, from <https://schoolofdata.org/2015/10/20/the-state-of-open-data-in-ghana-policy/>.
- Schryen, G., Wagner, G., & Benlian, A. (2015). Theory of knowledge for literature reviews: an epistemological model, taxonomy and empirical analysis of IS literature. In *In Thirty Sixth International Conference on Information Systems, Fort Worth*.
- Schryen, Guido, Benlian, A., Rowe, F., Gregor, S., Larsen, K., Petter, S., ... Yasasin, E. (2017). Literature reviews in IS research: What can be learnt from the past and other fields? *Communications of the Association for Information Systems*, 41(1), 759–774.
- Schultze, U., & Orlikowski, W. J. (2004). A practice perspective on technology-mediated network relations: The use internet- based self-service technologies. *Information Systems Research*, 15(1), 87–106.
- Schwartz, I. S., & Olswang, L. B. (1996). Evaluating child behavior change in natural settings: Exploring alternative strategies for data collection. *Topics in Early Childhood Special Education*, 16(1), 82–101.
- Scott, W. R. (2008). Approaching adulthood: The maturing of institutional theory. *Theory and Society*, 37(5), 427–442.
- Seidel, J. V., & Clark, J. A. (1984). The Ethnograph: A computer program for the analysis of qualitative Data. *Qualitative Sociology*, 7(1–2), 110–125.
- Seidl, D., & Whittington, R. (2014). Enlarging the strategy-as-practice research agenda: towards taller and flatter ontologies. *Organization Studies*, 35(10), 1407–1421.
- Sein, M. K., & Furuholt, B. (2012). Intermediaries: Bridges across the digital divide. *Information Technology for Development*, 18(4), 332–344.



- Shahadu, S. (2019). The state of Ghana open data. Retrieved September 20, 2019, Available from <http://sadiq.goifnetwork.org/2019/the-state-of-open-data-in-ghana>.
- Silva, L. (2007). Epistemological and theoretical challenges for studying power and politics in information systems. *Information Systems Journal*, 17(2), 165–183.
- Silva, L., & Backhouse, J. (2003). The circuits-of-power framework for studying power in institutionalization of information systems. *Journal of the Association for Information Systems*, 4(1), 294–336.
- Sivarajah, U., Weerakkody, V., Waller, P., Lee, H., Irani, Z., Choi, Y., ... Glikman, Y. (2016). The role of e-participation and open data in evidence-based policy decision making in local government. *Journal of Organizational Computing and Electronic Commerce*, 26(1–2), 64–79.
- Smith, A. G. (2001). Applying evaluation criteria to New Zealand government websites. *International Journal of Information Management*, 21(2), 137–149.
- Smith, M. L., & Reilly, K. M. A. (2013). The Emergence of Open Development in a Network Society. *Open Development: Networked Innovations in International Development*, 15–50.
- Srivastava, S. C., & Theo, T. S. H. (2007). What facilitates e-government development? A cross-country analysis. *Electronic Government*, 4(4), 365–378.
- Stinchcombe, A. L. . (1986). Review : Milieu and structure updated reviewed work (s): The constitution of society by Anthony Giddens review. *Theory and Society*, 15(6), 901–914.
- Straub, D., Lock, K., Evaristo, R., Karahanna, E., & Srite, M. (2002). Towards a theory-based measurement of culture. *Journal of Global Information Management*, 10(1), 13–23.
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Sage Publications, London.
- Tanner, M. (2009). Communication and culture in global software development: The case of Mauritius and South Africa. *Journal of Information, Information Technology, and Organization*, 4, 57–85.
- Tian, Y., & Stewart, C. M. (2005). Framing the sars crisis: A computer-assisted text analysis of cnn and bbc online news reports of sars. *Asian Journal of Communication*, 15(3), 289–301.
- Tobin, G. A., & Begley, C. M. (2004). Methodological rigour within a qualitative framework. *Journal of Advanced Nursing*, 48(4), 388–396.
- Tolbert, C. J., & Mossberger, K. (2006). The effects of e-government on trust and confidence in government. *Public administration review*, 66(3), 354–369.
- Tolbert, P. S., & Barley, S. R. (1997). Institutional and structuration: Studying the links between action and institution. *Organization Studies*, 18(1), 93–117.
- Tondeur, J., Hermans, R., van Braak, J., & Valcke, M. (2008). Exploring the link between teachers' educational belief profiles and different types of computer use in the classroom. *Computers in Human Behavior*, 24(6), 2541–2553.



- Tsai, W., & Ghoshal, S. (1998). Social capital and value creation: The role of intrafirm networks. *Academy of Management Journal*, 41(4), 464–476.
- Tsang, E. W. K. (2014). Case studies and generalization in information systems research: A critical realist perspective. *Journal of Strategic Information Systems*, 23(2), 174–186.
- Ubaldi, B. (2013a). OECD Working Papers on Public Governance.
- Ubaldi, B. (2013b). Open government data: Towards empirical analysis of open government data initiatives. *OECD Working Papers on Public Governance*, (22).
- Van Alstyne, M., Brynjolfsson, E., & Madnick, S. (1995). Why not one big database? *Database*, 15(267), 267–284.
- Africa Data Revolution Report 2018. Status and emerging impact of open data in Africa. UNDP/UNECA/WF/OD4D. Pp.1-98. Available from: <http://webfoundation.org/docs/2019/03/Africa-data-revolution-report.pdf>
- Christ, M. H., & Nicolaou, A. I. (2016). Integrated information systems, alliance formation, and the risk of information exchange between partners. *Journal of Management Accounting Research*, 28(3), 1–18.
- Van Der Heijden, H. (2004). User Acceptance of Hedonic information systems. *MIS Quarterly*, 28(4), 695–704.
- van Schalkwyk, F., Willmers, M., & Schonwetter, T. (2016). Institutionalizing Open Data in Government. Available at SSRN 2925834.
- van Schalkwyk, Francois, Willmers, M., & Czerniewicz, L. (2014). Open data in the governance of South African higher education. *OpenUCT*, 55.
- Verhulst, S. G., & Young, A. (2017). *Open data in developing economies: Toward building an evidence base on what works and how* (p. 284). African Minds.
- Vetrò, A., Canova, L., Torchiano, M., Minotas, C. O., Iemma, R., & Morando, F. (2016a). Open data quality measurement framework: Definition and application to Open Government Data. *Government Information Quarterly*, 33(2), 325–337.
- Vetrò, A., Canova, L., Torchiano, M., Minotas, C. O., Iemma, R., & Morando, F. (2016b). Open data quality measurement framework: Definition and application to Open Government Data. *Government Information Quarterly*, 33(2).
- Vota, W. (2018). Surprise! Esoko's agricultural market prices are private sector failures. Retrieved November 21, 2018, from https://www.ictworks.org/esoko-agricultural-market-prices-failures/#.W_UMGDgzaM8.
- W.J. Orlikowski. (1992). The Duality of Technology : Rethinking the concept of technology in organizations. *Organization Science*, 3(3), 398–427.
- Wacquant, L. (1998). Pierre Bourdieu. In R. Stones (Ed.), *Key sociological thinkers* (pp. 215–229). London: Macmillan Education UK.
- Walsham, G. (1995). Interpretive case studies in IS research: Nature and method. *European Journal of Information Systems*, 4(2), 74–81.



- Walsham, G. & Han, C.-K. (1991). Structuration theory and information systems research. *Journal of Applied Systems Analysis*, 17, 77–85.
- Walsham, Geoff. (2002). Cross-cultural software production and use: A Structural analysis. *MIS Quarter*, 28(4), 359–380.
- Walsham, Geoff. (2006). Doing interpretive research. *European Journal of Information Systems*, 15(3), 320–330.
- Wang, F. (2014). Explaining the low utilization of government websites: Using a grounded theory approach. *Government Information Quarterly*, 31(4), 610–621.
- Wang, H. J., & Lo, J. (2016). Adoption of open government data among government agencies. *Government Information Quarterly*, 33(1), 80–88.
- Wang, V., & Shepherd, D. (2020). Exploring the extent of openness of open government data – A critique of open government datasets in the UK. *Government Information Quarterly*, 37(1), 101405.
- Wang, V., Shepherd, D., & Button, M. (2019). The barriers to the opening of government data in the UK: A view from the bottom. *Information Polity*, 24(1).
- Weber, M. (1999). *The three types of legitimate domination* (In: Essays). Princeton University Press, Princeton, NJ, USA.
- Weber, R. (2004a). The rhetoric of positivism versus interpretivism: A personal view. *MIS Quarterly*, 28(1), iii–xii.
- Whetten, D. A. (1989). What constitutes a theoretical contribution? *The Academy of Management Review*, 14(4), 490–495.
- Whitmore, A. (2012). Extracting knowledge from U.S. department of defense freedom of information act requests with social media. *Government Information Quarterly*, 29(2), 151–157.
- Whittington, R. (2015). Giddens, structuration theory and strategy as practice. *Cambridge Handbook of Strategy as Practice, Second Edition*, (December), 145–164.
- Willmers, M., Schalkwyk, van F., & Schonwetter, T. (2015). Licensing Open Data in Developing Countries: The Case Study Of The Kenyan and City of Cape Town Open Data Initiatives, (16), 26–37.
- Willmott, H. (1981). The structuring of organizational structure administrative science. *Administrative Science*, 26(3), 470–474.
- Wirtz, B. W., Weyerer, J. C., & Rösch, M. (2017). Citizen and open government: An empirical analysis of antecedents of open government data. *International Journal of Public Administration*, 00(00), 1–13.
- Wirtz, B. W., Weyerer, J. C., & Rösch, M. (2019). Open government and citizen participation: an empirical analysis of citizen expectancy towards open government data. *International Review of Administrative Sciences*, 85(3).
- Wirtz, B. W., Weyerer, J. C., Thomas, M.-J., & Möller, A. (2017). E-government implementation: Theoretical aspects and empirical evidence. *Public Organization Review*, 17(1), 101–120.



- Woolfrey, L. (2015). *An open African data approach to improving data quality*. Development Policy Research Unit.
- World Bank Group. (2015). *Open Energy Data Assessment Accra, Ghana*. Retrieved from http://opendatatoolkit.worldbank.org/docs/odra/odra_energy-accra.pdf.
- Xiao, W. (2010). China's limited push model of FOI legislation. *Government Information Quarterly*, 27(4), 346–351.
- Yang, L., & Zhiyong Lan, G. (2010). Internet's impact on expert-citizen interactions in public policymaking-A meta analysis. *Government Information Quarterly*, 27(4), 431–441.
- Yang, T. M., & Wu, Y. J. (2016). Examining the socio-technical determinants influencing government agencies' open data publication: A study in Taiwan. *Government Information Quarterly*, 33(3), 378–392.
- Yates, J. (1997). Using Giddens' Structuration Theory to Inform Business History. In *Conference on "The Future of Business History" Hagley Museum and Library* (Vol. 26, pp. 159–183).
- Yildiz, M., & Saylam, A. (2013). E-government discourses: An inductive analysis. *Government Information Quarterly*, 30(2), 141–153.
- Yin, R. K. (2002). *Case Study Research: Design and Methods*. SAGE.
- Yin, R. K. (2013). Analyzing case study evidence how to start your analysis, your analytic choices, and how they work. *Case Study Research: Design and Methods*, 127–164.
- Youngblood, N. E., & MacKiewicz, J. (2012). A usability analysis of municipal government website home pages in Alabama. *Government Information Quarterly*, 29(4), 582–588.
- Zhao, Y., & Fan, B. (2021). Effect of an agency's resources on the implementation of open government data. *Information & Management*, 58(4), 103–115.
- Zietsma, C., & Lawrence, T. B. (2010). Institutional work in the transformation of an organizational field: The interplay of boundary work and practice work. *Administrative Science Quarterly*, 55(2), 189–221.
- Zuiderwijk, A., & Janssen, M. (2015). Participation and data quality in open data use: Open data infrastructures evaluated. In *Proceedings of the 15th European Conference on E-Government* (pp. 351–359).
- Zuiderwijk, A., Janssen, M., & Davis, C. (2014). Innovation with open data: Essential elements of open data ecosystems. *Information Polity*, 19(1), 17–33.
- Zuiderwijk, Anneke, Helbig, N., Gil-García, J. R., & Janssen, M. (2014). Special issue on innovation through open data-A review of the state-of-the-art and an emerging research agenda: Guest editors' introduction. *Journal of Theoretical and Applied Electronic Commerce Research*, 9(2).
- Zuiderwijk, Anneke, & Janssen, M. (2013). A coordination theory perspective to improve the use of open data in policy-making. *Proceeding 12th Conference on Electronic Government (EGOV)*, 38–49.



- Zuiderwijk, Anneke, & Janssen, M. (2014a). Open data policies, their implementation and impact: A framework for comparison. *Government Information Quarterly*, 31(1), 17–29.
- Zuiderwijk, Anneke, & Janssen, M. (2014b). Open data policies, their implementation and impact: A framework for comparison. *Government Information Quarterly*, 31(1), 17–29.
- Zuiderwijk, Anneke, Janssen, M., Choenni, S., Meijer, R., & Alibaks, R. S. (2012). Socio-technical impediments of open data. *Electronic Journal of E-Government*, 10(2), 156–172.
- Zuiderwijk, Anneke, Shinde, R., & Janssen, M. (2018). Investigating the attainment of open government data objectives: Is there a mismatch between objectives and results? *International Review of Administrative Sciences*.

APPENDIX 1: SUMMARY OF CONTEXT AND DATA COLLECTION

At the start of the study, data were collected from the two leading OGD publishers in Ghana and several OGD users (academia, data journalists, non-Governmental Organizations (both profit and non-profit, citizens, international researchers, observer groups/organizations, technology enthusiasts). However, the initial sample was changed due to emerging themes. For instance, the researcher added other government institutions that were not “traditionally regarded as OGD publishers.” In addition, potential future users of OGD were added to the sample population due to the issues raised by the initial sample on their use of OGD in Ghana. The sample population of OGD users was mostly based in Greater Accra and a few from the Ashanti and Central region. These three regions are considered to be urban cities. The Greater Accra region is the capital city and also the seat of government. The region houses all the government institutions.

Prior to the collection of primary data which took the form of face to face and online interviews. The researcher had to ensure that quality primary data was collected from the right respondents. Consequently, an online google search was conducted in order to understand the OGD ecosystem in Ghana and the key actors within the ecosystem. Search words such as open data in Ghana, Open Government Data in Ghana, and Ghana Open Data initiative were used for the search. This search was beneficial in identifying the two main OGD publishers in Ghana and the users. The search also led to the discovery of an excel document that has been collated by the (Open Data for Impact) OD4Impact Map Africa Organizations. In addition, the researcher was a country researcher for the African Open Data Barometer Report and the Africa Open Data Revolution Report, both in 2018. The researcher was also part of the team selected to review the Ghana Draft Open Data Policy in October 2018. All these resulted in a database of relevant actors and a social network that the researcher could draw on for contacts.



to monitor and ensure that quality data was available and accessible and link the available data with the SGD indicators.

Interviews with the NGOs also took the form of group interviews (between 3 to 4 respondents). All the NGOs involved in this study requested the interview guide and a research summary before agreeing to grant the interview. Although their knowledge of the interview guide and the research was essential, the researcher observed the following:

1. It made the participants knowledgeable about the investigation.
2. It enabled the organization to select the right interview participants.
3. Some of the interview participants had already decided exactly what to tell the researcher. This affected follow-up questions as the participants expressed surprise upon being asked additional questions. A few chose not to respond to the follow-up questions.

After the first round, follow-up interviews were difficult as some of the respondents explained they had busy schedules. Thus, the follow-up interviews mainly were done online through Skype and zoom as well as telephone conversations. Some of the first interviews were also done online because some of the respondents were either out of the country or wanted it that way. Also, the researcher was a full-time student who lived temporarily outside of Ghana but was available within specific periods for collecting data.

Some of the Non-Governmental Organizations (NGOs) invited the researcher to their meeting and training workshops with other stakeholders within the OGD ecosystem in Ghana. Although the researcher was not allowed to record, writing down field notes was allowed. The researcher attended data journalism workshops, OGD stakeholders' meetings, hackathons, and civil rights training. This training was targeted at increasing the number of data journalists in the country and opening up the debate on how to get media houses to appreciate data journalism. The researcher also attended hackathons that were organized by some of the NGOs. This enabled the researcher to further interact and see hands-on apps developed with available government data. Some researchers were also interviewed. These were aware of the phenomenon but could not be categorized as NGOs.

APPENDIX 2: CASE SELECTION AND DATA COLLECTION

A semi-structured interview guide was developed and used during the interview. Semi-structured interview guides enabled the researcher to clarify questions to respondents, ask follow-up questions and reduce questions during the interview. It also led to a re-structuring of the interview questions based on the response from the interview participants. The first interview took the form of a group interview (consisting of 8 participants). These participants were specialists from different departments within Publisher 1.

This was followed by interviews with two international observers and research organizations. This also took the form of group interviews (2 participants from each). Access to these participants was birthed out of the researcher's participation with the Open Data Barometer report and the Africa Open Data Revolution report in 2018. The participants, however, issued a disclaimer before the interviews began.

Interview with Publisher 2 also took the form of a group interview with two participants. Although the researcher observed that the group interviews were possible because the participants worked as a team within the organizations, the responsibility of these teams was

Access to data journalists for this study was difficult due to the emerging nature of this category of journalists in Ghana. To address this, the researcher through snowballing, was introduced to an NGO in Ghana that specialized in training data journalists especially in the extractive sector. The NGO in recent years engaged in training data journalists from other sectors in Ghana, especially incorporating data newsroom reporting.

Because most of the interviews took the form of group interviews, they lasted between one to three hours. But the interview with the data publishers took about five hours due to the team's constitution (roles, position, and symbolic capital).

It is important to emphasize that the researcher anticipated that the interviews would take the form of individual face-to-face interviews. This changed on the day of the interviews because the participants felt it was easier to interview them as a team than individuals due to time availability.

The main challenge faced during data collection was the unwillingness of some of the respondents to be recorded. The interview thus was given verbal consent and had to write the

responses from the participants as field notes. Furthermore, they did not want their voices to be stored or given to anyone aside the researcher.

Some participants, nonetheless, gave their consent to be recorded. Consequently, a digital recorder and Samsung Galaxy mobile phone were used for the recording. A notepad was to write notes and follow-up questions when needed. The notepad also helped the researcher write up responses from participants who were not willing to be recorded.

The selection of different interview participants and multiple data sources for the study enabled the researcher to apply the fundamental principle of hermeneutics and multiple interpretations (Klein & Myers, 1999b). Applying the fundamental principle of hermeneutics, the researcher understood the OGD ecosystem in Ghana and why OGD is yet to be institutionalized by recapitulating empirical data from different sources. The principle of multiple interpretations also enabled the researcher to understand and present contradictory and similar interpretations to the interview questions.

APPENDIX 3: EMPIRICAL OBSERVATIONS

The researcher made some critical observations during the interviews, follow-ups, and workshops. These observations are listed below:

1. Power: this was observed during the group interviews; it was attributed to people in authority within the organizations. Heads or team leaders could quickly stop members from giving too much information. They also controlled most of the interview by attempting to answer every question. They quickly interrupted others during the interview. At a point, some of the experts decided not to respond to some of the questions. In addition, the sitting arrangements and behaviors during the interviews reflected power relations among the organizational actors and the power of data and other resources in the organization.
2. Power was also observed from the alliances and collaborative networks that were formed. This power was expressed based on the kind of data DU access to due to social connectedness. Also, the international counterparts that belonged to the alliance and collaborative networks were seen as a source of power and social influence.
3. Power was observed during the interviews and workshops the researcher was invited to.
4. Sharing or publishing data was considered as a loss of authority and identity. Due to a strong attachment to data and the provision of government services, controlling government services was seen as a form of symbolic capital and prestige.
5. Skills and experiences were considered as a form of power.
6. Discussion and data communities presented grounds for conflict and conflict resolutions regarding the quality of datasets.
7. Although, an internet search of DU in Ghana may lead to a long list of Non-Governmental Organizations, the reality was that most of the organizations were run by the same people. The same individuals owned and operated the same organization but with different names. This discovery made the researcher agreed to group interviews.
8. DU organized workshops and training to educate civil societies and advocate groups on findings from data analysis. The workshops and training sessions on gathering and



publishing government data were also organized for public sectors. Some of the DUs also organized workshops where public sector officials were invited. Workshops that involved Data Publishers and a selection of public sector workers focused on mutual education of participants. The selection of public sector representatives was based on the individual's social and symbolic capital.

APPENDIX 4: EXTENDED CODE BOOK BASED ON STRUCTURATION THEORY

Table 25: Sample Code book based on Structuration Theory

Concept	Theoretical Explanation	Key Concept	Particularization
Social System	Constitutes a continuum of produced and reproduced social activities	Institutions, actors and related activities	OGD ecosystem
Social Structure	Consists of rules and resources which are used by individuals during interaction.	Can be obtained through the identification of rules and resources used by actors during interaction within the social system.	Different rules and resources are used by actors with the aim of either publishing or using OGD. There are national, international and organizational rules that have been produced and reproduced over time.
	Result of actions by individuals. Structure exists due to social actions or activities carried out by actors.		
Rules	Generalizable techniques or procedures that are used to create and re-create social action by actors	Organizational, national and international laws, scientific methodologies	Non-adherence attracted symbolic sanctions. The yet to be implemented RTI law. Contradictions with institutional rules that had not been addressed.
	Actors use linguistic languages and specific codes in communicative action. These are valid organizational norms and rules drawn upon for social interaction by actors		
	Lack of adherence attacks sanctions		
Resources	These signify capacities to generate command over material and non – material objects. Also used as a power generation procedure.	Can be identified by examining activities of actors during interaction in the social system	Data as a resource that warranted control by DPs. Data was an allocative resource that produce power which actors used to control others.
	Includes the use of allocative resources and means		

Concept	Theoretical Explanation	Key Concept	Particularization
	(material objects) and non-material capacities to harness the activities of other human beings – authoritative resources.		Technological (software and tools) and human resources (skills, experiences, training, knowledgeability).
Agency	These are people, actors or individuals who perform actions by depending on structures. These actions are carried by relying on the memory traces of actors.	Can be identified by examining users and publishers of OGD. Actors or individuals who interact within the social system or the OGD ecosystem.	Multiple – actor perspective includes – Data publishers and users. Example public administration, civil servants, NGO's, data and technology enthusiast, academic researchers and citizens (mostly beneficiaries). These actors are in the same OGD ecosystem and their and attach meanings to OGD. These meanings include technological, political, economic or bureaucratic (Gonzalez – Zapata & Heeks, 2015).
Domination	Giddens explained power/domination in light of access and use of both allocative and authoritative resources. • Allocative (material)resources: actors' control over tangible assets or objectives. • Authoritative(intangible) resources: actors' ability to control other actors	Can be identified though actors use of resources (both material and non – material)	• Power (domination) was associated to data ownership by data publishers. • The perception and behavior of actors towards data ownership influenced data control and data sharing behavior.

Concept	Theoretical Explanation	Key Concept	Particularization
			- Power was also associated with networks among both data publishers and users. Data users felt they exerted power over other users based on their networks nationally and internationally. These networks were also used as way of acquiring resources such as financial support, technology, exposure and access to data.
Legitimation norms	Giddens posited that rules may refer to legitimation.	Identified by examining how social activities are communicated during interaction by actors.	Used as a way of approving data publication and use – which was lined to data quality. Legitimation was viewed as a subjective process. OGD users for instance, looked at both internal and external factors (such as technological and human resources) as well as potential results of using OGD.

Concept	Theoretical Explanation	Key Concept	Particularization
Signification	Meanings are inferred by actors by using prevailing practices or experiences. Meanings are identified via structures.	Identified by examining actor's use of experiences/history, skill and knowledge during interaction, publication and use of OGD.	The practices of actors within the OGD ecosystem affects the meanings they inferred on prior, during and after publication and use of OGD. For instance, the experiences of data quality challenges by OGD publishers have led to the "backlisting" of data from specific government institution.
Interaction	Actors within a social system interact with each other through an acceptable means of communicative channels	Identified by examining different modes of communication among actors	An actor's interaction is driven by data quality assessment. This is done through discussion, telephone conversations, teams and the use of networks (use of different communication channels).
	Interaction within a social system may produce power as a result of the use of both allocative and authoritative resources	Verbal and non-verbal communication (use of symbols, gestures)	
	The rules of social engagement or interaction between actors in a social structure may produce sanctions based on acceptable rules and norms		

APPENDIX 5: INITIAL CODES

Code Number	Name of Code
1	Data availability
2	Data quality is a critical issue
3	Primary source of data
4	Data teams
5	Data quality
6	Communication
7	Discussion
8	Right to data institutionally and beyond
9	Right to use
10	Right to control data use institutionally and beyond
11	Data teams
12	Data communities
13	Legislative mandate
14	Purpose of data use
15	Timeliness
16	Create networks
17	Government data
18	Data ownership
19	Data culture as a disadvantage to the OGD movement
20	Trust
21	Data sharing
22	Easy access to data
23	Donor support
24	International laws
25	Organizational laws
26	It is better sometimes to know someone in a department
27	Authority of government and agencies
28	Discuss data among my colleagues
29	It is government approved but by experience you need to assess it
30	There are different sources of data, so it is important to know who owns it
31	Technological skills
32	Experiences with data is very important
33	Storytelling to make an impact
34	Just searching and browsing the internet
35	Data must be validated to ensure it is in a presentable state
36	But I should be able to trust government data
37	We need data journalists to report in different languages
38	I ordered a data which I had to spend a lot of time on it. so, skills and experiences are important
39	Machine readable formats
40	Challenges of OGD
41	Lack of understanding of the concept
42	Difficult to let go of sometime that once gave you power and control
43	Sanctions
44	Institutional factors can be major issues that need to be dealt with

Code Number	Name of Code
45	The government data we use is dependent on who we want to influence
46	Data is very powerful
47	Your access to data increases your power
48	Having the correct government data and using it well can trigger a lot of changes and international and national debate
49	We don't approach data based on who we are, we approach it based on the story we want to tell
50	If you could predict what data, it will not be interesting.
51	Reasons why meta data is essential
52	Reasons why we don't give our data out.
53	Human resources
54	government data to help us critique and monitor what is happening
55	Government has the resources and right to collect citizens data
56	Roles of actors are important when using data to make impact
57	The data belongs to the people but why is everything not in the public space
58	I have a lot of knowledge about openness, so is changes everything
59	There are sensitive data which needs to be protected
60	contradiction between national and organizational laws
61	I don't have to beg for data to use
62	Developer communities
63	Hackathons
64	Organizationally specific methodologies
65	Technology as a resource
66	Networks as a form of competitive edge
67	Social factors
68	Cultural factors
69	Manual paper – based process to electronic is challenging
70	Language
71	Leadership
72	Reusable
73	Integration
74	Connections
75	Data interoperability
76	Child labour
77	Training
78	Missing values in government data may lead to misinterpretation
79	Difficult understand
80	User friendly formats
89	Data roadmap
90	SDG indicators
91	Government portal
92	A lot is changing on the way we actually look at government data
93	How do we ensure that we share and use data in an open format
94	By assessing it
95	We need a discussion on data

Code Number	Name of Code
96	Data needs to be meaningful. It is not about just numbers
97	There is a misconception between statistical data and open data
98	Data needs to be legitimate; it should go beyond the use of software's
99	I easily get data from my colleagues in other institutions. So, friendship is important
100	Attend training workshops
101	Train your team members
102	Be innovative with data
103	Data in the newsroom is important
104	Culture of journalism makes data journalism difficult
105	Context is very important when it comes to use
106	Multi – stakeholder perspective
107	Roles
108	Experiences
109	Imitations
110	Unlimited nature of using data
111	Too many parallel initiatives
112	proactively share data
113	Need for collaboration with not just users but also publishers
114	People just produce table after table but must go beyond that
115	Economic analysis, descriptions on things, but you can have discussions around it
116	Why should it be difficult for an ordinary Ghanaian to get data
117	We need to be able to pull data from different sources and analyze it
118	How do we make sure people are using the right data
119	We also collect our own data
120	Real time government data
121	Knowledge
122	We cannot force them to bring their data
122	We are mandated to build the platform and upload data when given
124	Money, time and other resource to collect, process and store data, so we can't force them.
125	Use plan
126	Interaction
127	We are aware of the social issues surrounding openness in Ghana
128	Every user is aware of the challenges of data quality
129	The source of data is important
130	Sometimes we have to call the source to redefine the terms of use
131	Data visualization
132	Data interpretation
133	The perception is we become owners of the data when it is on our portal
134	We need to understand that when we share data, the source will always be cited
135	It is more about trying to control what belongs to everybody
136	Why is the data not available for the very people who you got it from
137	Technical openness

Code Number	Name of Code
138	Legal openness
139	We need to learn from other institutions and countries.
140	Rewards
141	Sectorial datasets need to integrate
142	Action Plans
143	Increase display of reusable data
144	We get data from some institutions because we have friends there
145	Use data to educate citizens
146	Working groups that will follow the implementation of the laws
147	Using networks as a source of power
148	Networks were intentionally and un – intentionally created
149	Institutional factors also affect data use
150	Develop applications across different platforms
151	App development and story telling
152	Control
153	Data users
154	Technology enthusiast
155	Developer communities

APPENDIX 6: REVIEWED THEMES

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
Data Ownership	Publishers and users view and perception of who OGD belonged to	Data on the Government mandated web portal was regarded as government data.	Government data	<i>The misconception is who does the data really belong to? This is a critical discussion that we need to have but has not been seen as important. (DU 1 affirmed by D5)</i> <i>[...] you don't understand... we as a government institution also can be owners of the data because it is uploaded on the portal we develop and manage, but we have to include the sector it is coming from. The issue of who the data belongs to is important in our case, but it is a bit complex (DP2)</i>
		Though the data was available on government web portals, the data is about the people, hence, it belongs to them.	Citizen data	<i>Why should it be difficult for an ordinary Ghanaian to get access to data (DU4 affirmed by DU2)</i> <i>It is like it is difficult for the very people whose data has been accumulated to get access to it [...] hmm (DU1)</i>
		Data sharing was considered as a challenge established on the issue of ownership.	Data sharing	<i>There is a problem with sharing data among us. And I think it is because the system is not integrated, and this is affecting the new movement (PS1 affirmed by PS2)</i> <i>People feel they will lose when they share the data that they have. Data is like a source of power to them. And telling them to give it</i>



Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
				<i>to use is like stripping them of that power [...]</i> (DU 1 affirmed by DU5)
		OGD publishers and users identified public institutions and online portals as critical primary sources of data	Primary source and Organizational Mandate	<i>Our mandate was extended to build the portal [...], but you have to know that we cannot force them to bring their data [...] we upload as we get them. (DP2)</i> <i>If I have a story in mind to tell, I first of all, go online and search for data available on it and who owns it (DU7)</i> <i>We search online for data, with our mission in mind and the apps we want to develop (DU1)</i> <i>We tell stories based on the data available. We mostly get data from (DP1) they have more current and up to date data on Ghana (DU 4 affirmed by DU7)</i>
		Although data had different sources, it was required to identify the owner	Data sources and data ownership	<i>We sometimes get it from data.gov.gh, which is down at this moment. In the last two years, if I needed government data, that is where I got to first. I also check the website of DP1 and the websites of other government institutions (DU3)</i>
		Controversy surrounded the actual owner of government data	Data ownership	<i>The perception is, we have become owners of the data when it is on our portal (DP2)</i> <i>[...] I don't get it who actually owns the data (DU1, 2, 3)</i>



Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
				<i>[...] Data belongs to the citizens [...]</i> (Van Belle, 2018)
		Data users expressed their views on the need to understand data ownership	Recognizing the sources of data	<i>People have to be told that the more they publish their data, the more others will become aware. And the source will always be contacted (DU1 affirmed by DU2)</i> <i>We need to understand that when we share data, the source will be cited (DU1)</i>
		DU and the government-mandated publishers of OGD also collect raw citizen data. But citizen's data collected and stored by DU were not open.	Reasons why some NGOs engage also engage in data collection Private data generation	<i>Because of the challenges with government data, we also collect our own data. But it is not open at all [...] it is for the organization (DU 5)</i> <i>I can tell you the number of times we have an idea to write a story, but because we don't get the right data to support it, the story just goes down (DU 5)</i>
		"confiscation" of data by publishers as well as users	Why is data not available for the very people you got it from	<i>I know the data is available, so why can't we get access to it. It looks like monopoly due to the powerful nature of data and who has the data (DP2 affirmed by DU2)</i>
		Mandate inferred by government	Authority	<i>We have rules that mandate us to publish government data, so we use them. [...] not to brag but I think we have the best resources being it technological, connections and financial which helps publish and government data (DP1)</i>



Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
				<i>We have been mandated to publish government data, make sure it is technically available. This happened in 2011 after the country became a signee to the OGPI (DP2)</i>
Control		Because organizational time, money, and skills were used in collecting, process, and storing data; there was a desire to exert some influence.	Time, money spent in collecting, processing and storing data (Resources)	<i>You know they spend a lot of time and money into collecting, process and storing the data so, I think it leads to that feeling of the data belongs to that particular institution (DP2, DU5)</i>
	Appropriation of rights to OGD	Some OGD publishers demanded that it was essential to control data both within the institution and	Right to control data institutionally and beyond (Institutional control)	<i>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 [...]. It is tough you, know (PS1 affirmed by 3)</i>
		OGD user's perception of using government data	Right to use (Control use)	<i>The data belongs to all of us, we need it to create innovation for the ordinary Ghanaian who does not understand these things (DU4)</i>
		OGD publishers' quest to control how published data should be used.	Right to control data use	<i>We have to be aware of what our data is being used for. It is about doing what is right (PS 2)</i>
		Establish continuous control over data use due to ethical and privacy rights	Right to continuously control data use Institutionally and beyond	<i>How do we make sure people are using the right data in an acceptable way (PS1,3)</i> <i>Some of these NGOs, take our data to make money out of it, and sometimes they don't even acknowledge us. So, I think it is fair to be aware of what our data is being used for (PS affirmed by DU3)</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
		Perception of control by some OGD users	Perception of ownership by users	<i>It is more about trying to control what belongs to everybody (DU1, 4)</i> <i>We have reasons why we do not give our data out [...]. There is a lot of competition out there and we have to protect our interest. And a lot of time and money into it (DU1)</i>
Data Quality	Addressing the challenge of OGD quality	Both OGD publishers and users recognized OGD quality and a challenge that needed to be addressed	Data quality as a critical Concern	<i>"... example security flaws; individual and institutional norms and standards of quality (e.g., weak scientific rigor in analysis); legal confusion or gaps; or marginalized businesses and other incentives [...]" (Verhulst & Andrew Young, 2017, p. 35)</i> <i>"[...] when risks are not addressed at the initial stages of the value cycle (e.g., when dirty data is not cleaned at the collection stage), they accumulate and lead to additional risks downstream [...]" (Stefaan G. Verhulst & Andrew Young, 2017, p. 35).</i>
		The provision of up-to-date data meant constantly updating the OGD portals which new data.	Real-time government data/timeliness	<i>Publishing past data for trend analysis is critical for growth [...] (DU 4)</i>
		Real-time OGD was sometimes equated to quality		<i>I can say that the timelier, the data is the better the quality hmmm maybe (DU1)</i>
		OGD users depend on metadata to understand	Availability of metadata	<i>People here just used to produce table after table in their report, and it is hard to understand those numbers and it is hard to</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
		available data and ensure data quality		<i>understand those numbers and it is hard to understand what those numbers mean [...] because half a time you just get descriptions of the numbers (DU1 confirmed by DU2)</i>
	Subjective and collaborative nature of addressing OGD quality.	On occasions where metadata was not available to OGD users communicated with data publishers to ensure agreement on quality	Communication	<i>Sometimes if we don't understand something within a particular dataset, we call the source [...] so it can be the government publishers or other public institutions (DU2)</i>
		To ensure that available OGD was of quality, users seek for the views of their colleagues within the OGD ecosystem.	Data Communities	<i>We have to organize and have major round-table kind of discussions around OGD in Ghana (DU4)</i>
			Data Teams	
			Discuss among my colleagues	<i>[...]it is happening but at a very slow pace. We need everyone to be involved (DU3)</i>
			Data must be jointly validated to ensure it is in good shape. It was a type of legitimation criteria for data quality.	
			Just by critically assessing it firsthand	
	Technology as a supporting tool	Used as tools to support the assessment of OGD to ensure quality	Use of software's	<i>To make is simple and efficient, we use a software (DU3)</i>
	Organizational Requirement	The two main OGD publishers had different organizationally acceptable ways of recognizing data	Organizational Methodologies	<i>We have a methodology that works for us [...] we use it for data collection and also to access the data of other institutions before publishing, and we review it based on previous experiences (DP1)</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
		quality before publishing it.	Institutional workflows	<i>We normally use a manual workflow. So, the data from other public institutions is taken through that workflow before it gets published (DP2)</i>
Resources	Technological	Use of technologies that would ensure technical openness as well as usage.	Acquiring the required the technology.	<i>We have the technological infrastructure from our end, but I don't know if this applies to the rest of the ecosystem (DP1, confirmed by2)</i> <i>'Each stage of the data life cycle contains risks. Risks associated with technological weaknesses (Verhulst & Andrew Young, 2017, p. 35)</i>
				<i>[...] we need software to ensure the available data is used to its maximum; there are some we even buy. (DU 2, confirmed by 4)</i>
	Laws Human	Employees should possess the right skills and experience to adequate harness OGD capabilities.	Human skills and experiences	<i>I know some of one particular ministry that should have been able to provide enough data to help with this Open Cities Accra Project [...], but they don't have the necessary human resource and skill [...] (DP2)</i> <i>We have the skill and the team to make this thing a success [...], it is evident when you visit our website [...] (DP1).</i>
	Reasons why networks are considered		International Funding/ exposure	<i>We get international funds. Starting organizations like this need that to open doors. (DU 5 confirmed by 6).</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
Network Creation	important by OGD users	Data users created networks for different reasons and purposes	Donor support	<i>Our donor support is evident [...], the international organizations mostly recommend and support these government initiatives also help us [...]</i> (DU 7)
			Donor support	<i>We are supported by different organizations; it is needed for exposure. When you go to our website you will see them [...]</i> they are mostly international (DU 3)
			Social connections	<i>It is better to know someone in the department. It makes it easy</i> (DU4)
	Networks as a source of power		Social connections Networks were created both intentionally and unintentionally.	<i>You must be connected [...] your connections give you an advantage over other organizations within the ecosystem</i> (DU6)
				<i>Sometimes we get data quickly from some institutions that we have connections or friends there [...] hmm I need is to make a call and request for it</i>
				<i>Knowing the right people in this space is necessary</i> (DU8 affirmed by DU4).
				<i>[...] there are some NGOs when they have an agenda, they don't think data. All they are interested in is do something just to create</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
				<i>connections. So, they produce lots of reports but don't have data as the foundation (DP2)</i>
Legislative Requirement	Legislative mandate	Required regulations	Implementation strategy	<i>We need working groups to ensure the laws are understood and implemented and sanctions applied (DP2 affirmed by DU 2)</i>
			International Requirement	<i>There is the OGPI action plan, I can say it is a law that leads to changes and implementation (DP1)</i>
			National laws	<i>There are many national laws that guide this movement. It just has to be implemented (DP2 confirmed by DU 2)</i>
			Organizational laws	<i>We have laws that work for us. It is currently undergoing review to implement a few clauses (DP1)</i>
				<i>When you go to them, they will tell you they have laws and we have to be aware. But where are these laws (DU1)</i>
			Legal Openness	<i>This movement is backed by laws such as the Data Protection Act, Privacy Act, and the Right to Information Act (this is yet to be implemented) (DP2, confirmed by DU 5)</i>
			Mandate	<i>We are mandated to build the platform and upload data when given or as at when we have access to it [DP2]</i>
			Mandate Knowledge	<i>We are mandated by law to publish statistical data. This has, however, changed due to the OGPI [...] we have now included other agencies and the SDG indicators (DP1)</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
Multi-stakeholder	The ecosystem is made up of different actors.	Capabilities of actors Acquired over time through training and use of government data.	Skills	<i>I got data from somewhere, and I realised I had to spend a lot of time on it before working with it [...] you see it will take someone with the required skills and experience to do this kind of things (DU 4)</i>
			Experiences	<i>Experiences with government data is important [...], you just need it. It is critical, it makes you aware of what you are dealing with at a time (DP1 affirmed by DU2)</i> <i>Different people have different reasons for using government data</i> <i>We use it mostly to tell stories [...] we need more data journalism especially in the newsroom (DU 2)</i>
	Technology as a tool to support is seen as a skill acquired by OGD users	Used as tools to support and appropriate government data	Technological capabilities	<i>We have general software's that we use when we are working with government data, we also have organizationally acquired ones. And we have the skills to operate it (expressed by all the data users)</i>
				<i>A joint stakeholder workshop on effective strategies to implement the Right to Information (RTI) was organized by Penphylsbytes, ChriAfrica and PN Africa Watch on (source facebook, 2019)</i> <i>Each city has a local partner working alongside city government officials to map public infrastructure using OpenStreetMap and its ecosystem of open-source tools (DU1 affirmed by DU5)</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
Culture	Data sharing culture social factors	Organizational stipulates how things used to be and how it expected to be as a result of OGD movement	Social factors that are organizationally dependent	<i>Once you start to proactively share data in a way that can be re-usable and accessible it changes the dynamics (DU1 affirmed by DU2)</i>
				<i>Institutional factors like culture can be a major factor that affects data sharing.</i>
				<i>Sharing institutional data has always been our challenge. I always it is deep rooted in institutional culture (DU1 affirmed by DU3)</i>
				<i>There are times I don't really blame the other institutions for not wanting to share. [...] moving from paper based unintegrated platforms to integrated ones. It is something that has been part of them for long (DP2)</i>
				<i>I think there is long way to go in terms of the front liners hmm [...] so it is something that we can constantly push (DU1)</i>
				<i>It used to be the case that you request for data, so you have to write and say you need data blablabla [...] a lot is about data culture you see. (DU1)</i>
Use	User friendly	Publish data in formats that can easily be used and reused	Access to data	<i>...but once you start getting data in a format that is user friendly, accessible and visual. It can change perceptions, facilitate discussions on actual trends [...] (DU1 affirmed by DU2)</i>
				<i>If we have the quality data, its use will be unlimited. Data is a very powerful thing</i>



Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
				<i>We develop different applications, with the aid of data (DU3)</i>
				<i>We organize hackathons for data enthusiasts and the tech community... we give them data and ask them to work with it. This comes with monetary incentives that will help them scale up the innovation (DU2 affirmed by DU3, 7)</i>
				<i>Using data can trigger a lot of impact and innovation (DU5)</i>
				<i>There was once I needed to write a story on domestic child abuse, I realised it was taking too long to get the data so I used my connection hmmm [...] the story we told was groundbreaking [...] it readdressed the misconception on gender and domestic child abuse [...] (DU4)</i>
				<i>[...] the data enabled us establish trends of poverty in Ghana which changed people's perception. [...] we discovered the existence of a c community within the greater Accra Region whose poverty level was higher than that of the Northern Regions. This triggered the provision of some government interventions (DU 3).</i>
				<i>I can tell you the number of times we have an idea to write a story but because we don't get the right data to support, the story just goes down (DU 5)</i>

Reviewed Theme	Theme	Description	Sub-themes	Quotations from Some Interview Participants
Collaboration and Communication	Inter-connectedness and effective use	Create ways by which awareness can be leveraged on to increase use and impact	Formation of discussion groups and teams	<i>I think there are too many parallel initiatives, we need a form of integration which is spearheaded by the right data (DU2)</i>
				<i>[...] and became aware of people who are doing like economic analysis, descriptive things with government data and you actually have a fruitful discussion about it (DU2 affirmed by 3)</i>
				<i>We need to see more initiatives where data users and producers are in one room discussing data. We really need this (DU8 affirmed by DU3)</i>
				<i>You know what collaboration can do? It can lead to changes in the syllabus and the practice of journalism (DU3 affirmed by DU4)</i>
				<i>When there is that collaboration and discussion on it, it can actually help other data publishers learn from different countries (DU2)</i>
				<i>Collaboration is important, as we speak, we are working with Statistics South Africa. We are also trying to implement [...] citizen generated data. It will be more qualitative in nature (DP1)</i>
				<i>Discussions, data teams round table meetings (expressed by all DU and DP)</i>



Appendix 7: Coding

Scheme Table 25: Inductive Coding Scheme for OGD Publication and use.

Constructs	Explanation	Same Illustrative Codes
Structures	<i>Dual – interactive relationship between multiple actors and the OGD ecosystem. This dual interaction influences OGD publication and use.</i>	<i>The Open Government Partnership brings together government reformers and civil society leaders [...] (Shahadu, 2019) Open Data Advocate in Ghana (http://sadik.goifnetwork.org/2019/the-state-of-open-data-in-Ghana)</i>
Signification	Multiple actors within the OGD ecosystem use experiences with OGD to infer how data can be published, used and data quality. For instance, OGD publishers use different organizational and contextually informed methodologies to access data quality before publication.	<i>We have the people and the experience, collecting, organizing and publishing government data is what are mandated to do. We also know the institutions that provide us with quality data because of our long contact with them (PS2)</i> <i>Hhmm I know where and how to get government data [...] (PS1)</i>
	Practices surrounding data publication and use are contextually internalized.	<i>There is a desired structure which is explicitly discussed and followed organizationally, this influence both the data that is published and from which governmental institution the data is obtained. We have our own methodologies, and they are applied right from selecting data when collectors [...] (PS2)</i> <i>Our use of government data is not only dependent on availability but also the story when want to tell or the app we want to develop. It is also sometimes influenced by our partners (DP1)</i>
Domination/power	Findings linked to data ownership. Desire to control data.	<i>We are supposed to get data from all the public institutions and publish on the web portal. This is how ever challenged by issues with quality and who the data belongs to [...]. Aahh in a way the data is theirs [...] (DP2)</i> <i>We collect our own data, using our own trained people hmm [...] you see. We train them, provide technical support and pay them for the data. In a way the data is ours [...] you have to ask for it, if you need it (PS 1)</i>

		<i>Our data is of high quality you understand...hmmm we have a methodology that we use and some technology though not enough (DP1)</i>
	Findings show that power or domination is not only exercised via resources but is exercised also through networks. OGD users use the networks they have created as resource to signify power within the OGD ecosystem	<i>You need to know people; you need the connections [...] it is very important for survival (DU3)</i>
	Technology is used as resource to express domination or power	<i>We have the technology and the skills, there are times we even help some government institutions in their data collection. This helps us to collect and store our own data and validate that of government. But ours is not open.</i>
	The mandate given to data publishers by law and OGPI requirements gave them a type of control over data.	<i>We are required by law to publish government data from all the institutions, so in a way we should have control, but it is not so [...] (DP1affirmed by DP2)</i>
Legitimation	Findings showed that legitimation is tied to approving OGD. Findings revealed that there are organizationally internalized subjective rules and norms that are used to address data what constitutes legitimate data.	<i>In department, we have a workflow, that data from other institutions go through before they get published. If it does not meet our organizations standard it does not get published (DP1)</i> <i>We have an organizational workflow. So, the data has to go through this workflow to ensure it conforms to our standard before it can be uploaded (DP2)</i>
Modalities	Different forms of communication are used to provide meaning to data and access data quality	<i>If we have issues about a particular government dataset, what we normally do is call the owners and discuss the data to understand it and close the gap (DU6)</i> <i>We have rules that mandates us to publish government data, so we use them. [...] not to brag but I think we have the best resources being it technological, connections and financial which helps use publish government data (DU1)</i>

Knowledgeability	The knowledge of actors on OGD was considered essential.	<i>Me for instance, I know a lot about this openness thing. I am aware of citizen's data that can be in the public domain and those that cannot. [...] so, when you come and the data is not online, I can give it to you so far as it not sensitive data (DU5)</i> <i>You have to know a lot about this openness thing, the rules, the dos and don'ts. In our organization for instance, we try to always add the source of our data when telling our stories (DU6)</i>
Reflexivity	Findings revealed that there are accumulated data at specific institutions that needs to be technically open.	<i>[...] for instance, this smart Accra project can easily be done if some particular institutions will just make their data technically open or just give it to the mandated OGD publishers (DP1)</i>
Agency	The OGD ecosystem consists of interaction between multiple stakeholders. These stakeholder view data from different perspective OGD ecosystem consists of both human and non-human actors, which interact within each other. These interactions are intertwined and influenced OGD publication and use	<i>Our responsibility is to make sure that government data is technically available. Using it to create impact lies in the hands of citizens (DP1)</i> <i>We once had data from one of the ministries, after taking it through thorough reviewing to ensure quality. We started to analyze, and our finding was shocking [...] it changed our whole perspective on the child labor thing. There is a particular community in Ghana were those most susceptible to child labor were males and not females (DU3)</i> <i>We tell stories with data [...] (DU1)</i>
Socially constructed Behavioral Practices and Patterns		
Data Ownership + Control	Government Data is viewed as a resource, and its control was a source of power or dominance	<i>[...] you need to understand that in a way they are right, they are right, they used their own resources to collect the data. <u>Hmmm</u> yes, there is a law that says that they have to give us the data so we can upload but the law is yet to be implemented. Remember also that there are organizational laws that protects them and their data. (DP1)</i>

		<i>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 [...]. It is tough you know (PS3)</i> <i>People need to be educated that when you give your data out... hmmm it does not necessarily mean you have lost ownership. As I told you it is a cultural thing. Most of them don't want to share (DU3 Confirmed by DU4)</i>
	National, international and organizational laws on openness were used contradictorily and influenced OGD publication and use	<i>Hmmm [...] I mean the RTI passage is not enough, we need to implement it and make it work (DP2).</i> <i>Also, when you need data, these institutions will refer you to their laws but you don't see these laws. I think with the exception of DP1, they have laws that requires them to publish government data. And it has been there for long, but I think now their mandate has been extended (DP2)</i> <i>[...] we have a law that works for us, as we speak, we have amended it and it is in parliament for consideration (DP1)</i>
Network Creation	Networks were created mostly by data users. These networks enabled them have access to financial resources as well as data.	<i>We need to create networks with both national and international organizations. We need money to create apps, train ourselves and others on how to use government data (DU5)</i>
	Friendship was used as resource to express domination with regards to access to data that should otherwise be open. This friendship was created within the networks.	<i>It used to be the case that you request for data, so you have to write and say you need data blablabla [...] a lot is about data culture you see. For instance, if I need government data from particular institutions, I will have to call a friend of my there and I will have access. But it should not be the case (DU2)</i> <i>There was once I needed to write a story on domestic child abuse, I realised it was taking too long to get the data so I used my connection hmmm [...] the story we told was groundbreaking</i>

		<i>[...] it readdressed the misconception on gender and domestic child abuse [...]. (DU2)</i>
Using Networks as a Source of Power	Data users usually created networks for support (financial and technological), to enable access to data. However, the created networks were also used as a form of power/domination.	<i>You know the connections you create determines how you are viewed by others in the ecosystem. Because of our connections and skills, we have been privileged to be involved in various government data projects [...] even collecting quality data (DU1)</i> <i>You know we are currently working with the government to revamp the OD portal in Ghana [...] (DU5)</i>
Discussion	Data communities and teams were formed with the aim of discussing OGD quality (based on available data)	<i>[...] I mean one of the things we wanted to promote data communities which will bring together producers and publishers [...] to have major discussions on published data. This is a way to ensure data quality (DU1)</i> <i>We don't just use data because it is published, we have teams whose members are experienced in this kind of stuff. [...] we meet and discuss to see if the data is right or wrong before we use it. The discussion is normally intense as we try to ensure quality and that the stories we are telling, and our visualizations are correct (DU2).</i>
	Hackathons also provided a means by which government data is discussed from multiple perspective and how its available data can be used efficiently and effectively to create value.	<i>I think the developer communities are not forth coming when it comes to using government data to aid innovation [...] (DU1)</i> <i>We organize various hackathons; what we do is we invite data enthusiasts who can and create apps by using government data. There were times we provided rewards (DU5)</i> <i>In April 2019 for instance, a hackathon was organized by one of the DU but this was in collaboration with the DPs. This hackathon was housed over fifty (50) data and technology enthusiasts [...] (DU2)</i>



Communication	Used as form to interaction between data publishers and users in order to understand data. This is used mostly in situations where meta data is not available or data requires further clarification from publishers.	<i>We normally call the owners of the data to discuss our observations and what we think of the data before we use (DP2)</i>
Organizational Mandate	This theme was mostly evident from the publishers of government data	<i>We have organizational control quality measures that we always put in place and it is usually monitored throughout the process (DP1).</i> <i>We have been mandated by government to publish data from all the government institution (DP1)</i>
Multi- stakeholder Perspective	Activities of different actors	<i>We are a lot doing this stuff, there are those in government and us- the private sector people (DU1)</i>
Technological Domain		
Technology as a Resource	Paper-based data were now required to be automatically captured and reported. Technology used a medium to enable direct access to government data. The implementation and revamping of the OD portal.	<i>What has not been discussed in this open data movement is how to train the people and help them move from paper-based data capture, recording and storage. We need the sensitization [...] (PS3).</i>
	Knowledge and skill in technology is essential. Ability to purchase different software tools and use government data to create applications was important	<i>You need the knowledge and skills to survive, they are very important (DU2)</i>



APPENDIX 8: OGD IMPACT

Region	Country	Country I	Organizat	Organizat	Sectors	Descriptiv	URL	City	State/Reg	Founding	Size	Type of D	Advocacy	Advocacy	Product/!	Product/!	Organizat	Organizat	Research	Research	Other	Use - Oth
Sub-Sahar	Congo - C	Low inco	COLLECTI	Nonprofit	Governan	The goal c	http://www			2013			TRUE	Develops	FALSE		FALSE		FALSE		FALSE	
Middle Ea	Egypt	Lower mid	Ain Shams	Academic	Education	Ain Shams	http://www	Cairo	Cairo Gov	1950	1000+	Education	FALSE		FALSE		FALSE		TRUE		FALSE	
Middle Ea	Egypt	Lower mid	Mwazna	Developer	Governan	Mwazna is	https://m	Cairo	Cairo Gov	2015		Governme	TRUE	Uses oper	FALSE		FALSE		FALSE		FALSE	
Middle Ea	Egypt	Lower mid	Open Kno	Developer	Governan	Open Kno	http://eg			2013			TRUE	Has devel	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Ethiopia	Low inco	Code4Ethi	Developer	Governan	Code4Ethi	http://www	Addis Aba	Addis Aba	2015			TRUE	Has devel	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Gambia -	Low inco	Informatic	Nonprofit	IT and gec	ITAG aims	http://www	Bakau	Banjul	2004			TRUE	Collaborat	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Code for C	Nonprofit	IT and gec	Code for C	http://www	Madina	Greater Ac	2015	1 to 10	Agricultur	TRUE		TRUE	Various pr	FALSE		FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Farmerline	For-profit	Agricultur	Farmerline	http://farr	Kumasi	Ashanti Re	2012	11 to 50	Agricultur	FALSE		TRUE	Provides r	FALSE		FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Mobile Co	For-profit	Media and	MC.C is a	http://www	Accra	Greater Ac	2004	11 to 50	Consumer	FALSE		FALSE		TRUE	Uses oper	FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Mobile Co	For-profit	IT and gec	MC.C con	http://www	Accra		2015	11 to 50		FALSE		FALSE		TRUE	In collabor	FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Mobile W	Nonprofit	IT and gec	Acommun	http://mobile	webgh	Greater Ac	2010		Agricultur	FALSE		TRUE	Technolog	FALSE		TRUE	Trend ana	FALSE	
Sub-Sahar	Ghana	Lower mid	Odekro	Developer	Governan	Odekro pr	http://www	Accra	Greater Ac	2015	1 to 10	Governme	TRUE	Uses data	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Syecom	f	Agricultur	Syecom	http://www	Accra	Greater Ac	2009	1 to 10	Agricultur	FALSE		TRUE	Satellite ir	FALSE		FALSE		FALSE	
Sub-Sahar	Ghana	Lower mid	Wuni Zali	Nonprofit	Governan	Wuni Zali	http://www	Tamale	Northern	1992	11 to 50	Governme	TRUE	Helps pro	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Code for A	Nonprofit	Governan	Code for A	http://www	Nairobi		2015	11 to 50	Health/he	TRUE	Uses oper	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Code for K	Developer	Governan	Code4Ken	http://www	Nairobi	Nairobi Cc	2013		Education	TRUE		TRUE	Various pr	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Eduweb		Education	Eduweb is	http://www	Nairobi	Nairobi Cc	2001	1 to 10	Education	FALSE		TRUE	Provide ec	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Green Dre	For-profit	Agricultur	Green Dre	http://www	Nairobi	Nairobi	2000	11 to 50	Agricultur	FALSE		FALSE		TRUE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Institute o	Nonprofit	Governan	A think ta	http://ipfk	Nairobi	Nairobi	2013	1 to 10		TRUE		FALSE		FALSE		TRUE		FALSE	
Sub-Sahar	Kenya	Lower mid	M-Farm		Agricultur	M-Farm is	http://mfa	Nairobi	Nairobi Cc	2011	11 to 50	Agricultur	FALSE		TRUE	Built a mo	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Map Kiber		IT and gec	Map Kiber	http://ma	Nairobi	Nairobi Cc	2010	1 to 10	Education	FALSE		FALSE		FALSE		TRUE	Used gove	FALSE	
Sub-Sahar	Kenya	Lower mid	Mars Grou	Nonprofit	Governan	Mars Grou	http://ma	Nairobi	Nairobi	2006	51 to 200	Governme	TRUE	Uses oper	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Nation Ne	For-profit	Media and	Nation Ne	https://w	Nairobi	Nairobi Cc	2014	1 to 10	Agricultur	FALSE		TRUE	Data-drive	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Open Insti	Nonprofit	Business	The Open	http://www	Nairobi		2012	1 to 10	Governme	TRUE	Uses sust	FALSE		FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Open Schc	Developer	Education	Open Schc	http://ope	Nairobi	Nairobi	2014		Education	FALSE		TRUE	uses open	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Sagaci Re	For-profit	Business	Sagaci Re	http://sag	Nairobi	Nairobi Cc	2012	51 to 200	Demograp	FALSE		FALSE		TRUE	Utilize ope	TRUE		FALSE	
Sub-Sahar	Kenya	Lower mid	Upande	For-profit	IT and gec	Upande w	http://www	Nairobi	Nairobi Cc	2009	11 to 50	Demograp	FALSE		TRUE	Uses spat	FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Ushahidi	Nonprofit	IT and gec	Ushahidi i	https://www	ushahidi.com/		2008		Geospatia	FALSE		FALSE		TRUE	Integrates	FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	Water Ser	Other	Energy an	Water Ser	http://wat	Nairobi	Nairobi	2014		Other	FALSE		TRUE		FALSE		FALSE		FALSE	
Sub-Sahar	Kenya	Lower mid	medAfrica	For-profit	Healthcar	A Medical	http://shir	Nairobi	Nairobi Cc	2008	51 to 200	Health/he	FALSE		TRUE	Developed	FALSE		FALSE		FALSE	
Sub-Sahar	Liberia	Low inco	Liberia Fre	Nonprofit	Governan	The LFIC i	http://www	Monrovia	Montserra	2011	1 to 10	Governme	TRUE	Work and	FALSE		FALSE		TRUE	Research	FALSE	
Sub-Sahar	Madagasc	Low inco	Rural eMa	Nonprofit	Agricultur	Rural eMa	http://rur	Antananari	Antananari	2009	11 to 50	Agricultur	FALSE		TRUE	Uses oper	FALSE		TRUE	Use gover	FALSE	
Sub-Sahar	Madagasc	Low inco	eMarket	Nonprofit	Agricultur	eMarket is	http://rur			2012		Agricultur	FALSE		FALSE		TRUE		FALSE		FALSE	
Sub-Sahar	Malawi	Low inco	Malawi El	Nonprofit	Governan	In partner	http://mal	Limbe	Southern	2015	1 to 10	Governme	FALSE		TRUE	Helped ne	FALSE		FALSE		FALSE	



APPENDIX 9: COVER NOTES AND DECLARATION OF CONSENT BY INTERVIEWEES



UNIVERSITY OF CAPE TOWN

Department of Information Systems

Leslie Commerce Building
Engineering Mall – Upper Campus
OR Private Bag – Rondebosch 7701
Cape Town
South Africa

Mobile: +27738418073 or +233243967894

Dear potential participant,

I am conducting exploratory and explanatory research on the Legitimation effects on Open Government (OGD) Data adoption and use in Ghana. This is my PhD dissertation and hence will be published by the University of Cape Town. The key issues which I want to explore are the processes of legitimation by different stakeholders (supply and demand sides) of OGD in Ghana. How the process of legitimation by these stakeholders affect the adoption and use of OGD in Ghana. The influence of other factors such as social capital, habitus, roles and views on the process of legitimation and their effects on the adoption and use of OGD in Ghana. And the public value created after the adoption of OGD in Ghana. To give this a sound empirical basis, I want to investigate the supply and demand sides of OGD in Ghana in more detail. Ghana has been identified because of its recent strong update of Open Government Data.

Given that you feature prominently in the OGD scene in Ghana, I am hoping that you would avail some of your time to meet me and discuss freely the above issues. As an academic, I do not come with preconceived agendas but am genuinely interested in finding the truth about the different legitimation process and the best way to achieve the data quality and other societal improvements by means of OGD. I chose this research because I believe in its potential contribution to uplifting the continent and achieving the best possible returns on the investments which many international and local stakeholders are making on OGD.

I would really appreciate if you could afford me some of your valuable time to speak to me, ideally for about 30-40 minutes. I will of course fit in with your schedule or commitments; I am available anywhere and anytime during the day or evening: we can meet at your work, your home, my accommodation, a local restaurant or any other conducive environment. If necessary, we can also do it via Skype.

The main questions I would like to have your views on are

- (1) what are the processes of legitimating OGD;
- (2) How does roles and views influence the process of legitimation;
- (3) How does social capital and habitus affect the process of legitimation;
- (4) How does the legitimation affect the adoption and use of OGD;
- (5) what are the actual and potential public value created due to the adoption and use of OGD.

“OUR MISSION is to be an outstanding teaching and research university,
Educating for life and addressing the challenges facing our society.”



With public value, I refer to all possible public values, including economic, quality of life and educational development, more equality or political transparency to more qualitative social changes such as civil positive attitudes or a strengthened democracy.

This research has been approved by the Ethics Committee of the Faculty of Commerce, University of Cape Town. By agreeing to the interview, I will assume that you consent explicitly to the interview. You do not have to answer any/all of the questions. At any stage of the interview can you choose to terminate the interview, you can retract any statements you have made and you can request to remain anonymous if you so wish. I would prefer to record the interview but this is entirely at your discretion. You should feel free to say as much or as little on and off the record. I will not quote you or attribute anything to you without your approval (I will circulate a draft to you for scrutinization before showing it to anyone else).

I would be extremely grateful if you confirm your willingness and time availability by email at your earliest convenience. If you know of any other local stakeholders or experts that I should interview from either the supply or demand sides, it would be most appreciated if you let me have their contact details and/or provide me with an introduction.

Yours most sincerely

Signed by candidate

Hubeidatu Nuhu

PhD student

University of Cape Town, South Africa

Supervisor

Prof. Jean-Paul Van Belle

Declaration of Consent

I, Kwame Adu, hereby in my capacity asEconomic Advisor..... at UNICEF Ghana

consent that Hubeidatu Nuhu can collect data/use information from the stakeholder interview with me for the purpose of research towards her PhD, keeping in mind the need to check before attributing direct comments given the nature of my job.

Signed Kwame Adu

Date: January 2019



Declaration of Consent

I [redacted] hereby in my capacity as
Data Analyst at the

[redacted] (name of organization) consent or agree that
Hubeidatu Nuhu can collect data from the organization for the purpose of research towards her PhD.

Signed [Signature]

Date 12th - 08 - 2019

Declaration of Consent

I [redacted] hereby in my capacity as
CONTENT MANAGER at the

[redacted] (name of organization) consent or agree that
Hubeidatu Nuhu can collect data from the organization for the purpose of research towards her PhD.

Signed [Signature]

Date 13/6/2019

Declaration of Consent

I [redacted] hereby in my capacity as
Head of Demographic Statistics at the

[redacted] (name of organization) consent Hubeidatu Nuhu
can collect data from the organization for the purpose of research towards her PhD.

Signed [Signature]

Date 9/01/2019

Declaration of Consent

I [redacted] hereby in my capacity as
SENIOR STATISTICIAN at the

[redacted] (name of organization) consent Hubeidatu Nuhu
can collect data from the organization for the purpose of research towards her PhD.

Signed [Signature]

Date 09/04/2019



Open Government Data Publication and Use in a Developing Country: A Case of Ghana

Declaration of Consent

I hereby in my capacity as

DEPUTY DIRECTOR, PROGRAMS at the

..... (name of organization) consent or agree that
Hubeidatu Nuhu can collect data from the organization for the purpose of research towards her PhD.

Signed

Date

21/06/2019



APPENDIX 10: ETHICS APPROVAL LETTER



Faculty of Commerce

Private Bag X3, Rondebosch, 7701
2.26 Leslie Commerce Building, Upper Campus
Tel: +27 (0) 21 650 4375/ 5748 Fax: +27 (0) 21 650 4369
E-mail: com-faculty@uct.ac.za
Internet: www.uct.ac.za



@Commerce UCT



UCT Commerce Faculty Office

29th March 2019

Ms Hubei Nuhu
Department of Information
Systems
University of Cape Town

Dear Ms Nuhu

REF: REC 2019/000/024

THE LEGITIMATION EFFECTS ON OPEN GOVERNMENT DATA ADOPTION AND USE IN A DEVELOPING COUNTRY

We are pleased to inform you that your ethics application has been approved. Unless otherwise specified this ethical clearance is valid for 1 year and may be renewed upon application.

Please be aware that you need to notify the Ethics Committee immediately should any aspect of your study regarding the engagement with participants as approved in this application, change. This may include aspects such as changes to the research design, questionnaires, or choice of participants.

The ongoing ethical conduct throughout the duration of the study remains the responsibility of the principal investigator.

We wish you well for your research.

Shandre Swain
Administrative Assistant
University of Cape Town
Commerce Faculty Office
Room 2.26 | Leslie Commerce Building

Office Telephone: +27 (0)21 650 2695 / 4375

Office Fax: +27 (0)21 650 4369

E-mail: sl.swain@uct.ac.za

Website: www.commerce.uct.ac.za <<http://www.commerce.uct.ac.za/>>