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Open Government Data: An Institutional Logics Perspective

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A Doctoral Thesis submitted in partial fulfilment of the requirements for the award of Doctor of Philosophy in Business Informatics and Accounting at University of Reading

Henley Business School
Business Informatics and Accounting

August 2020

Declaration of Authorship

I confirm that this is my own work and the use of all material from other sources has been properly and fully acknowledged.

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Acknowledgements

Despite the challenges, my PhD was an interesting journey, allowing the sustainability and productivity of highly intellectual thoughts. I thank God and my family and friends who supported me during this journey, which would not have been possible without their support and encouragement. I thank my government, the Sultanate of Oman, for sponsoring my PhD research.

My gratitude to my supervisors (Dr Daniel Gozman and Professor Keiichi Nakata) for their guidance, professional advice, continuous support and encouragement. I am honoured to have worked under their supervision to accomplish this thesis and contribute to the body of knowledge. Dr. Gozman, your invaluable advice has helped me to view the world from different perspectives. Thanks for your support, feedback and patience, without which it would have been impossible to succeed.

I thank my parents who encouraged me to pursue my higher education, and my appreciation goes to my late father Saleh Ahamed Al Farsi, and my mother Fatma Ahamed Al Farsi for their support and encouragement. I am grateful to my lovely wife, Najah Al Hamdi, for her support and patience during the PhD journey. I appreciate her efforts, time and love in supporting our family while I was away in the UK. I extend my gratitude to my son Saleh, and my daughters Dana, Maram and Rawan for their support to me and my wife during this time.

I thank BISA staff at Henley Business School for their support during my research. Finally, I give my appreciation to my friends whom have supported me during the PhD journey, especially Shahid Al Balushi, Khalid Al Zadjali and Qasim Al Mamri.

Abstract

Many countries in the world recently initiated the Open Government Data (OGD) to achieve transparency, accountability, value from the data and to transform public sector into smart and open government. However, the (OGD) initiatives faces challenges that hinders the initiatives to achieve the desired objectives, particularly in developing countries.

The information systems adoption literature indicates a lack of studies investigating OGD adoption at an early stage from the national ecosystem perspective. This research investigates the early stage of adoption of the national OGD. The study adopts the institutional perspective to investigate the role of institutional logics and institutional pillars. The research aims to answer the research question: *How do the institutional logics affect the emergence and adoption of the Open Government Data initiative in the public sector?* This study adopts the interpretive research methodology with data collected from a single-embedded case study that encompasses nine government organisations in Oman. It captures the institutional logics qualitatively, by applying *pattern inducting* technique, that affects the adoption of OGD in the public sector in a complex institutional environment.

The phenomena investigated reveals that the institutional pillars affect the institutional logics in the institutional environment. It shows how the institutional logics and institutional pillars interplay at the macro- and micro-level. It also shows that normative and cultural-cognitive pillar have a prominent effect, whereas the regulative pillar has less-prominent effect. This study captured one dominant and three competing logics that enable/hinder the OGD initiative from achieving the desired objectives: *Institutional Acceptance Logic (ACL)*, *Institutional Roles Logic (IRL)*, *Ownership and Control Logic (OCL)* and *Institutional Capabilities Logic (ICL).* The findings show that dominant logic is complemented by three co-existing subordinate institutional logics.

This research contributes to the IS literature and to the institutional theory and further explains how the institutional logics and institutional pillars affect the adoption of the OGD initiative. It outlines how institutional logics are shaped and reconciled in the complex environment at the national level. It offers a holistic view from an ecosystems perspective and explains how institutional logics interact in a heterogeneous institutional environment. Given the tensions between the dominant and competing institutional logics, the adoption progresses at a slower pace. These tensions exist between micro and macro levels, and contribute negatively to the adoption of the OGD initiative. The study suggests that in order to reconcile the competing logics, a combined collaborative initiative to be formed between regulatory authorities at the national level. In addition, it offers a conceptual framework for OGD adoption at an early stage, and assists the policymakers and practitioners by presenting a holistic view from the institutional perspectives to attain the desired objectives.

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List of Abbreviations

IAL	Institutional Acceptance Logic
ICL	Institutional Capabilities Logic
ICT	Information Communication and Technology
ILP	Institutional Logics Perspective
IRL	Institutional Roles Logic
IS	Information Systems
IT	Information Technology
ITA	Information Technology Authority – Oman
NCSI	National Centre for Statistics and Information – Oman
MOCS	Ministry of Civil Service – Oman
MOH	Ministry of Health – Oman
MOMP	Ministry of Manpower – Oman
MOT	Ministry of Transport – Oman
MM	Muscat Municipality – Oman
OCL	Ownership & Control Logic
OD	Open Data
OGD	Open Government Data
PASI	Public Authority for Social Insurance – Oman
PS	Public Sector
PSI	Public Sector Information

Chapter 1 : Introduction

1.1 Introduction

The purpose of this chapter is to provide an overview of the research project. The chapter comprises ten sections. This section introduces this chapter. The second section highlights the research background and the third section elucidates the research problem. The fourth section sets out the research motivation of the study, and the fifth outlines the research scope. Section six presents the research question and sub-questions. The seventh section states the research aims and objectives. The research design and thesis roadmap are illustrated in section eight, while section nine presents the thesis structure. Section ten summarises the chapter.

1.2 Research Background

With the advent of Internet and e-Transformation services worldwide, the public sector (PS) is one of the largest data generators of information (Janssen, 2011). Government organisations in the public sector capture, manage and store different types of data and information. However, the dissemination of the information has only been considered recently by many governments. Given the availability of data and the value it holds, many governments are seeking to adopt Open Government Data (OGD) initiatives (Janssen *et al.*, 2012; Veljković *et al.*, 2014; Bertot *et al.*, 2014; Zuiderwijk and Janssen, 2014; Mellouli *et al.*, 2014).

To better understand the OGD adoption, several studies in IS investigated it from different theoretical lenses (e.g. Veljković *et al.*, 2014; Zuiderwijk *et al.*, 2015; Wang and Lo, 2016; Talukder *et al.*, 2019), however limited studies investigated the OGD initiatives from institutional lens (Fan and Zhao, 2017; e.g. Altayar, 2018; González-Zapata and Heeks, 2017). Although the studies address the OGD initiative through the institutional theory lens, they lack emphasis on the institutional logics role where the empirical studies show their importance in the information systems (IS) research (Currie and Guah, 2007; Sahay *et al.*, 2010; Asangansi, 2012; Gawer and Phillips, 2013; Sandeep and Ravishankar, 2014; Hayes *et al.*, 2014). Furthermore, the recent literature shows a gap in studies that apply institutional logics in a complex institutional environment at the national level (Bunduchi *et al.*, 2019). The adoption of OGD is not limited to the technical perspectives, where other perspectives provide in-depth understanding of the OGD phenomena. This presents the ecosystem

concept that encompasses different perspectives at the OGD initiatives includes technical perspectives, political and environment's perspectives, organisational and institutional perspectives, internal and external institutional environment, and the complexity perspectives of OGD (Weerakkody *et al.*, 2017b; Lnenicka and Komarkova, 2018; Styrin *et al.*, 2017). In order to investigate the phenomena from the holistic (ecosystem) perspective, institutional logics and institutional pillars are essential to understand the effect of the OGD adoption (González-Zapata and Heeks, 2017). Moreover, few studies address OGD research in the early stage of adoption (Zuiderwijk *et al.*, 2015; Wang and Lo, 2016; González-Zapata and Heeks, 2017).

According to Swanson and Ramiller (2004), the stages of the innovation process of information systems are *comprehension, adoption, implementation,* and *assimilation.* This research focuses on the early stage of adoption to explore how institutional logics hinder or enable the OGD initiative at a national level.

1.3 Research Problem

Governments adopt OGD in order to enhance operational transparency, efficiency, citizens' well-being and their engagement in public affairs, economic growth, and national security (Keen *et al.*, 2013; Barry and Bannister, 2014). Many governments in developed countries have established the OGD initiative to engage public participation and collaboration, enhance transparency and accountability of the government organisations, facilitate economic value from data and increase efficiencies and effectiveness in government operations (McDermott, 2010; Zuiderwijk *et al.*, 2012a; Bentley and Chib, 2016). However, the OGD initiatives, particularly in developing countries, face challenges in achieving the desired objective and aims of OGD (Open Knowledge, 2014; Attard *et al.*, 2015; United Nations, 2018; González-Zapata and Heeks, 2017). The developing countries differs from the developed countries from different perspectives primarily the cultural norms perspective (Chen *et al.*, 2006) and economical perspectives (Wen and Hwang, 2019). Thus, the adoption of OGD in developing countries faces several challenges that hinders the OGD adoption from achieving the desired objectives from the OGD.

The literature shows few studies that address the adoption of OGD in developing countries from the national perspective. The OGD research addresses the OGD from the citizen perspective (Weerakkody *et al.*, 2017b), policies perspective (Zuiderwijk and Janssen, 2014; Nugroho *et al.*, 2015), complexity, security, ethics and privacy issues (Tankard, 2012; Bertot

et al., 2014; Gang-Hoon *et al.*, 2014). The OGD adoption faces several institutional constrains, thus it is essential to understand the effects from the institutional perspectives. The literature shows a gap in addressing the institutional perspective of the institutional logics and institutional pillars (González-Zapata and Heeks, 2017). Therefore, this study is to address the gap in conceptualising how the adoption of OGD is shaped by the institutional logics and institutional pillars at the early stage of adoption.

The following section states the motivation of the research, followed by the aims and objectives to address this gap in the body of knowledge.

1.4 Motivations of the Research

The motivation for this research is as follows:

1. The OGD initiative aims to improve the growth of the institution's strategic objectives to assist decision making (Galbraith, 2014). This process is initiated from top-down, and is mainly driven by exploration and discovery. Therefore, OGD is merely subject to political drivers rather than technical drivers in the institutional environment, an issue which needs to be addressed (Janssen *et al.*, 2012; González-Zapata and Heeks, 2017).

2. Governments usually sponsor OGD initiatives in the public sector at the national level, embracing complex institutional environmental and inter-organisational interactions of different stakeholders with different goals and objectives. This research addresses the complex institutional environment of OGD which is very limited in the OGD literature, particularly in developing countries.

3. Various scholars have applied institutional logics within the information systems research (Currie and Guah, 2007; Sahay *et al.*, 2010; Asangansi, 2012; Sandeep and Ravishankar, 2014; Hayes *et al.*, 2014; Berente *et al.*, 2019). However, to date few studies have applied the institutional logics in OGD research at the national level (González-Zapata and Heeks, 2017).

4. The focus of the previous studies in information systems that applies the institutional lens have adopted positivist approaches (Weerakkody *et al.*, 2009); however recent studies show importance on the interpretive studies (González-Zapata and Heeks, 2017; Safarov, 2019). Similarly, this study adopts an interpretive methodology to enrich OGD research, particularly by applying Reay and Jones (2016) *pattern*

inducing technique to capture the institutional logics qualitatively, which has not been applied in the OGD studies.

5. The OGD research is primarily contextualised to developed countries, and there are limited studies addressing context of developing countries (Wen and Hwang, 2019; Talukder *et al.*, 2019). There are currently no studies of OGD in the Omani context. Moreover, the OGD initiative in Oman appears not to be achieving the desired objectives set by the government. Therefore, it is essential to study the phenomenon to explore how the institutional logics and institutional pillars hinders or advance the OGD initiative.

1.5 Research Scope

Case study is considered as the most appropriate research strategy for IS empirical research (Myers, 2019). Therefore, this research investigates a single-embedded case study of OGD (Yin, 2014). The unit of analysis is the national level, that comprises two regulators at the macro-level ; and seven government organisations at the micro-level, as illustrated in Figure 4.3. The research setting entails organisational and social aspects, which makes interpretivism the more appropriate method to reveal an in-depth understanding of these phenomena (Creswell and Creswell, 2018). The research aims to answer the main question and sub-questions stated in the next section. OGD study is considered as IS research (González-Zapata and Heeks, 2017), and this research investigates the early *adoption stage* of the four stages of IS innovation (Swanson and Ramiller, 2004).

This research adopts the Klein and Myers (1999) principles for conducting and evaluating interpretive field studies. According to Klein and Myers (1999), it is not necessary to satisfy all the principles; a single principle is sufficient to ensure the validity and reliability of the research. This study uses the *principle of contextualization* and *the principle of interaction between the researchers and the subjects*. Critical reflection is applied through interaction with participants from various organisations at macro- and micro-levels. This research also uses the *principle of multiple interpretations* to account for different interpretations among the participants. The researcher uses different sources of data and applies data triangulation to ensure the reliability and validity of the data. Moreover, this research uses Lee and Baskerville (2003) framework on generalisability in IS research to generalises from the empirical to the theoretical, that is from the case study to theory (Eisenhardt, 1989; Walsham, 1995).

This study investigates the phenomena from the institutional and organisational perspective, where the technical perspective is not within the scope. Moreover, it investigates the OGD adoption from the national perspective and does not investigate the sub-national level.

1.6 Research Question

The aim of this study is to understand how the institutional logics affect the OGD initiative in the public sector at the early stage of adoption. Therefore, the research question is formulated as:

How do the institutional logics affect the emergence and adoption of the Open Government Data initiative in the public sector?

In order to answer the research question, this study addresses and answers the sub-questions to understand the phenomena in a systemic approach, as illustrated in Figure 1.1.

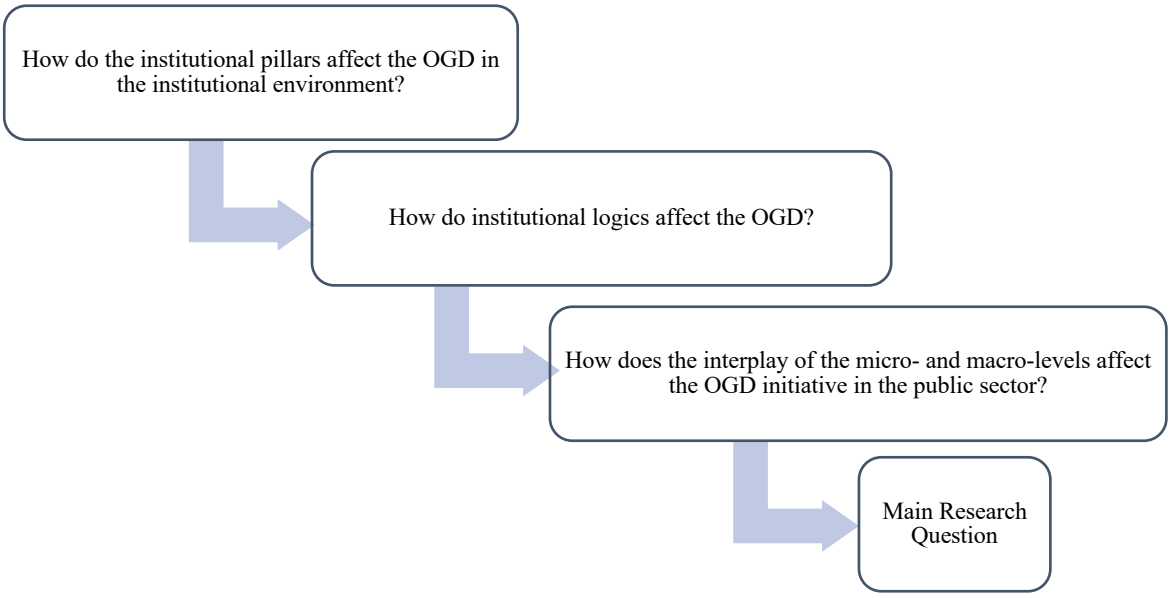

Figure 1.1 Research Sub-Questions

1.7 Research Aims and Objectives

This research project aims to explore and understand how institutional logics affect the adoption and emergence of the OGD initiative at the national level in the public sector. To achieve the research aim, the following objectives have been identified:

1. To explore the knowledge through the literature of institutional logics and information systems adoption to understand how the logics influence the emergence and adoption of the OGD initiative.

2. To review the literature on institutional theory and institutional logics in order to develop a conceptual framework based on the holistic view (ecosystems) of institutional pillars and institutional logics derived from the institutional environment.

3. To use the conceptual framework model to conduct empirical research using a qualitative case study research in a developing country (Oman) to explore how the institutional logics and institutional pillars affect the OGD initiative.

4. To conduct and perform an analysis of the data collected from the OGD initiative in the public sector in Oman to understand the interplay between the institutional pillars and institutional logics.

5. To discuss how the interplay between institutional logics and institutional pillars influences the OGD initiative in Oman at micro- and macro-levels and make recommendations on how the captured institutional pillars and institutional logics can be reconciled.

The research goals are thus to investigate the internal and external institutional pillars and institutional logics which significantly affect the emergence and adoption of OGD initiatives. The investigation is of a large-scale information system initiative, that is the national level in the public sector (PS) of the Sultanate of Oman.

1.8 Research Design

In order to address the research aims and objectives and to explore the phenomena, the progress of this study is outlined in Figure 1.2.

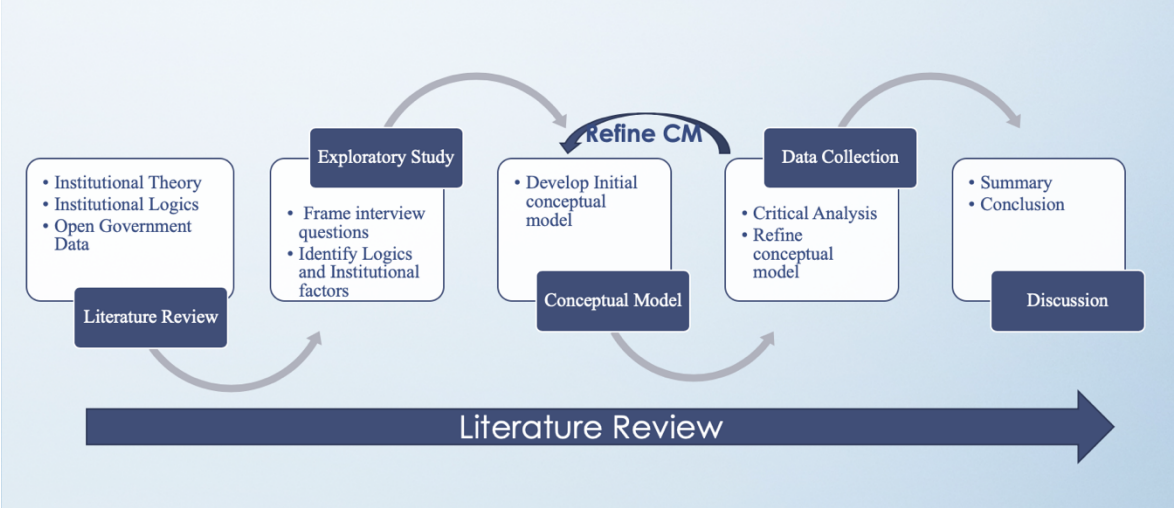

Figure 1.2 Research Outline (Adapted from (Eisenhardt, 1989) & Carroll and Swatman (2000))

These steps are adapted from Eisenhardt (1989) approach to conduct research inductively, building theories from the case study research. The qualitative research method is therefore adopted as it seeks to answer the research questions through the holistic view of social settings (Bryman, 2016; Creswell and Creswell, 2018). The researcher aims to uncover and observe participants' experiences that make sense and provide meaning for the institutional practices. The research design includes collection of primary and secondary data through semi-structured interviews, observation, documents, and the news media (Creswell and Creswell, 2018). The data analysis is from the institutional logics perspective (Thornton *et al.*, 2012), using the appropriate *pattern inducing* technique (Reay and Jones, 2016); and institutional pillars of the institutions (Scott, 2014); using thematic analysis technique (Saldaña, 2015).

The first stage of the research is the review of literature which addresses OGD and institutional theory from the institutional logics and institutional pillars perspectives, particularly in the context of OGD; note that this stage is a continuous process throughout the research cycle. The second stage is to conduct an exploratory study to understand the phenomena and to identify the procedures to be used in the subsequent full study. Initial data is collected during this stage to draft the initial conceptual framework. The third stage is the main data collection from the primary and secondary sources. This is followed by thorough analysis of the data collected, to refine the conceptual framework after reaching the saturation level. The research concludes with the discussion of the findings outlined in the previous stages.

1.9 Thesis Structure

The thesis is structured into seven chapters, illustrated in Figure 1.3 and described below.

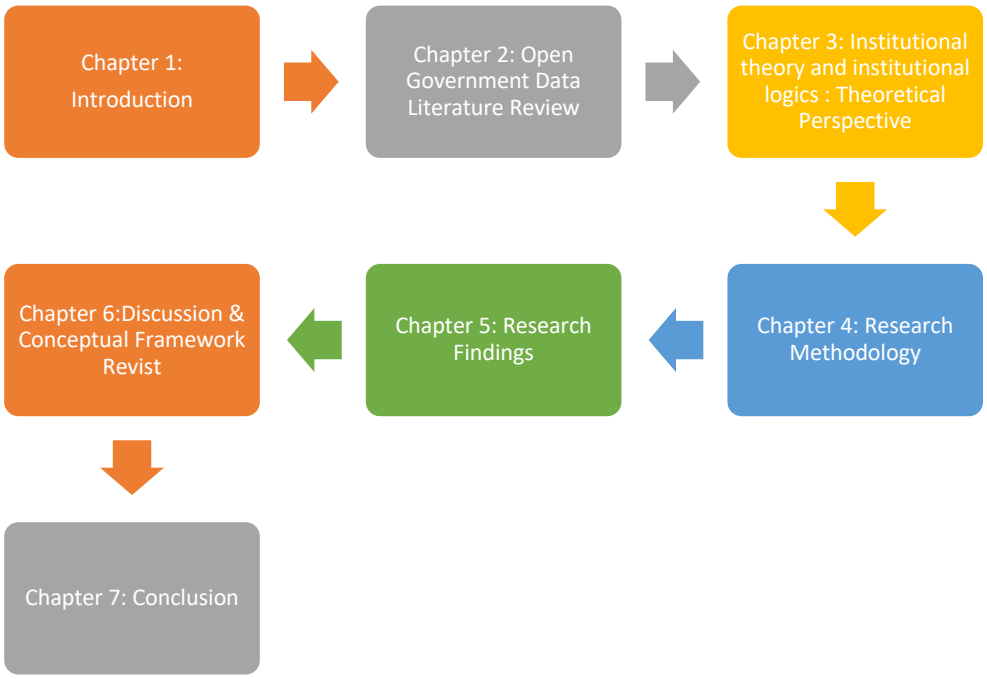

Figure 1.3 Thesis Structure

This **first chapter** introduces the research background and research problem, leading to the research aims and objectives. It briefly discusses the position of OGD in Oman. Finally, it outlines the flow of the research process and the thesis structure. **Chapter two** is a critical review of the literature on Open data and OGD. It addresses different aspect of open data and position the phenomena of this research from the institutional perspective. The chapter identifies the gap the OGD literature in applying the institutional logics and institutional pillars.

This chapter critically reviewed the literature on OGD and various perspectives of the initiative. It highlights the OGD movement and the definition of open data (Open Knowledge Foundation, 2012), and OGD (OECD, 2015). Value, motivations and barriers of open data and open-link data initiatives are illustrated from an organisational and institutional perspective. The institutional perspective highlights different aspects of open data related to organisational studies seen from the organisational rather than technical perspective through the lens of institutional logics. The chapter concludes by addressing the gap in the literature in applying institutional logics perspectives and institutional pillars to OGD phenomena.

Chapter three highlights institutional theory as the foundation for studying OGD adoption at an early stage. It addresses different facets of institutional theory and institutional logics (IL) and justifies the suitability of institutional logics as a lens through which to study the

OGD phenomenon. Moreover, this chapter elucidates the importance of institutional pillars to complement the institutional logics. The chapter also discusses the theoretical aspects of applying IL to IS research. It concludes by proposing the conceptual framework for the OGD initiative at the national level from the institutional pillars and institutional logics perspectives.

Chapter four describes the research methodology, outlining the research paradigm and the methodology applied. It describes how this research is conducted and discusses the methods employed and the protocol applied in exploring the OGD phenomenon from the initial stage of the research design to the stage of data analysis and interpretation. The chapter presents the rationale for adopting the qualitative interpretative paradigm, and concludes with the measures taken to ensure the rigour of the findings.

Chapter five outlines the findings that emerge from the analysis of the data collected from primary and secondary sources. The findings are conceptualised according to the initial framework proposed in chapter three. Finally, the chapter presents the institutional logics and institutional pillars captured from the OGD initiative in Oman.

Chapter six discusses the findings of the research presented in chapter six. It discusses how the institutional pillars and institutional logics affect the adoption of the OGD, and explains how and why the interplay between them affects OGD adoption. The chapter concludes by presenting a revised conceptual framework, reflecting the research findings.

Chapter seven provides a conclusion and summary of the research and states the key theoretical, methodological, and practical contributions to the body of knowledge. It also describes the limitations of the study and identifies future research areas.

1.10 Summary

The chapter introduces the research problem of OGD adoption at an early stage, with the aim and objectives in addressing the research questions. It describes the research cycle and the thesis structure. The next chapter reviews the literature on OGD.

Chapter 2 : Open Government Data Literature Review

2.1 Introduction

This chapter critically reviews the literature of OGD and related perspectives through the lens of information systems and organisational studies (Baskerville and Myers, 2002), specifically at the early stage of adoption of the information technology initiative.

The review has four main sections, taken from different perspectives. The first sheds light on the research into OGD, from its definition to the evolution of the technology in developing and developed countries. The second section discusses in depth the literature on OGD from the e-Transformation perspective. The third examines the topic from the organisational and institutional perspective, that address the institutional arrangements of OGD. The fourth section examines the literature addressing OGD phenomena from the institutional logics perspective, in particular addressing this gap in the information systems discipline. A final section summarises the chapter.

2.2 Open Government Data Context

This section presents definitions of OGD and illustrates how the movement began. It highlights how developing countries are characterised within the information systems literature, classified by several indicators. The position of this research within the different facets of open data is identified.

2.2.1 Open Government Data Definition

OGD is the data generated by government organisations which is freely accessible to everyone; it can be re-used and distributed freely without any restrictions. Although there is no single agreed definition of open data, the one most referred to is that proposed by the Open Knowledge Foundation (2012): “Open data is data that can be freely used, re-used and redistributed by anyone - subject only, at most, to the requirement to attribute and share-alike”. The OECD (2015) offers two definitions, one for *government data,* and the other for *open data*. The OECD’s definition of OGD is:

> Government data is any data and information produced or commissioned by public bodies; Open data are data that can be freely used, re-used and distributed by anyone,

> only subject to (at the most) the requirement that users attribute the data and that they make their work available to be shared as well.
>
> (OECD, 2015).

2.2.2 Evolution of Open Government Data

Since 2005, when the US emphasised the importance of opening government data, the concept has attracted the attention of many countries. The critical point was the Obama administration citing the open data era during the election campaign of 2009, followed by a programme of initiation (Obama, 2012). However, the concept is not new and was recognised in the USA as early as 1970 when the federal government released weather data, which worth approximately $30 billion (Gurin, 2014).

Many countries have established OGD initiatives, including Europe and some of the developing nations, including Oman. According to the Open Data Barometer, many developed countries established OGD initiatives worldwide where UK, USA and Canada are ranked as pioneering countries with higher capacity of OGD (Open Data Barometer, 2020). Following the data movement, UK established OGD initiative in 2009 by inaugurating the data.gov.uk portal to facilitate OGD to the public (Bates, 2012). However, the OGD initiative is relatively new to most developing countries as the Global Open Data Index (Open Knowledge, 2014) shows that those identified in accordance with United Nations classification (United Nations, 2018) have achieved less than 25% of the requirements for data openness.

Many countries worldwide have adopted national initiatives to transform their governments into eGovernment. OGD initiatives are considered as one of the eGovernment initiatives (Attard *et al.*, 2015). Developing countries have characteristics distinguishing them from developed countries which affect their OGD implementation, not only at the institutional level but also including people, processes and policies (Luna *et al.*, 2014). Chen *et al.* (2006) suggest a set of characteristics, as illustrated in Table 2.1, that differentiate developed and developing countries in adopting new information technology initiatives.

Table 2.1 Characteristics of Developing and Developed countries. (Adapted from (Chen *et al.*, 2006))

Characteristic	**Developed Countries**	**Developing Countries**
History and Culture	• Government and economy developed early, immediately after independence • Economy growing at a constant rate, productivity increasing, high standard of living • A relatively long history of democracy and more transparent government policy and rule	• The government usually not explicitly defined; economy not increasing in productivity • Economy not growing or increasing productivity; a low standard of living • A relatively short history of democracy and less transparent government policy and rule
Technical Staff	• Has a current staff, needs to increase technical abilities and hire younger professionals? • Has outsourcing abilities and financial resources to outsource; current staff would be able to define requirements for development	• Does not have staff, or has a very limited in-house staff • Does not have local outsourcing abilities and rarely has the financial ability to outsource; current staff may be unable to define specific requirements
Infrastructure	• Good current infrastructure • High Internet access for employees and citizens	• Bad current infrastructure • Low Internet access for employees and citizens
Citizens	• High Internet access and computer literacy; still has a digital divide and privacy issues • Relatively more experienced in the democratic system and more actively participate in the government policy-making process	• Low Internet access and citizens are reluctant to trust online services; few citizens know how to operate computers • Relatively less experienced in the democratic system and less active participation in the governmental policy-making process
Government Officers	• Decent computer literacy and dedication of resources; many do not place eGovernment at a high priority	• Low computer literacy and dedication of resources; many do not place eGovernment at a high priority due to lack of knowledge on the issue

In addition, several studies have categorised countries by their level of economic development, technological sophistication, and standard of living (Paroški *et al.*, 2013;

Yanjie and Wan, 2013; Wen and Hwang, 2019), using various indicators to assess readiness at the development level. These indicators include Gross National Domestic Product (GDP), Corruption Perception Index (CPI), Democracy Level (DL) and Human Development Index (HDI) (Ciborra, 2009; Paroški *et al.*, 2013; Yanjie and Wan, 2013; Attard *et al.*, 2015; Vetrò *et al.*, 2016; Wen and Hwang, 2019). According to Wen and Hwang (2019), developed countries achieve high levels of CPI, DI, GDP and HDI; thus their intention to open data to facilitate economic, democratic and human development is at a high level. Table 2.2 illustrates OGD studies that applied different indicators to assess the OGD initiatives.

Table 2.2 Indicators applied in OGD studies (Adapted from (Wen and Hwang, 2019))

Indicator	Studies	Description
Gross National Domestic Product (GDP)	(Ciborra, 2009; Harrison and Sayogo, 2014; Attard *et al.*, 2015; Weerakkody *et al.*, 2017b; Zeleti and Ojo, 2017)	The GDP is measured from the social and commercial value of OGD. The OGD value contributes to the country's GDP. Moreover, from the social perspective, the OGD allows the citizens to utilise the data in their daily activities, which in turn contributes to the GDP.
Corruption Perception Index (CPI)	(Attard *et al.*, 2015; Davies and Perini, 2016; Wen and Hwang, 2019)	Two goals of OGD are to facilitate transparency and reduce corruption. Developed countries are at a high level in the indicator and OGD adoption, and data openness is at a high level.
Democracy Level (DL)	(Ciborra, 2009; Zuiderwijk and Janssen, 2014; Attard *et al.*, 2015; Vetrò *et al.*, 2016; Wen and Hwang, 2019)	OGD increases the democracy level from the perspective of sharing, transparency, participation, and collaboration. Countries with high DI values have high levels of data openness.
Human Development Index (HDI)	(Harrison and Sayogo, 2014; Attard *et al.*, 2015; Davies and Perini, 2016)	Countries with a high HDI level observe administrative transparency, and public participation through OGD, which is the case of developed countries.

In 2007, thirty OGD advocates formed the Open Data Working Group, which proposed eight principles for government data to be considered as open data. These principles are illustrated in Table 2.3.

Table 2.3 Open Government Data Principles (Open Data Working Group, 2007))

Principle	Description
1. Complete	All public data are made available. Public data are data that is not subject to valid privacy, security, or privilege limitations.
2. Primary	Data are as collected at the source, with the highest possible level of granularity, not in aggregate or modified forms.
3. Timely	Data are made available as quickly as necessary to preserve the value of the data.
4. Accessible	Data are available to the widest range of users for the widest range of purposes.
5.Machine Processable	Data are reasonably structured to allow automated processing.
6.Non-Discriminatory	Data are available to anyone, with no requirement of registration.
7.Non-Proprietary	Data are available in a format over which no entity has exclusive control.
8. Licence-Free	Data are not subject to any copyright, patent, trademark, or trade secret regulation. Reasonable privacy, security and privilege restrictions may be allowed.

Although addressing these eight principles is an essential element of implementing OGD initiatives, other principles have since emerged. In 2011, the Open Government Partnership (OGP) was formed by eight government leaders from different countries, including the UK and USA. The objective is to ensure government serves their citizens and to make government more transparent, participatory, and accountable (Hasan, 2018). Currently, more than 70 national governments and 20 local governments are members of the OGP. In addition to the eight principles highlighted by the Open Data Working Group, OGP argues that the OGD should be able to establish trust between citizens and government and to eliminate corruption (Hasan, 2018).

2.2.3 Open Data Value

Many governments in developed countries have identified the power of data, where they have established open data projects. For example, USA and UK have acknowledged this difference by delivering data to the public through the means of different online portals, e.g. www.data.gov and www.data.gov.uk (Hossain and Chan, 2015; Wang *et al.*, 2019). The US

administration focuses on increasing transparency, participation and collaboration with the objective of improving the quality of services provided to the public (Obama, 2012). However, other countries, including members of the European Union (EU), focus on direct and indirect economic value creation from the OGD (European commission 2015). Similarly, government organisations in developing countries have established open data initiatives to increase transparency and to provide better services, and to transform themselves into smart government (Attard *et al.*, 2015; Wijnhoven *et al.*, 2015).

The main objectives of OGD initiatives are to engage public participation and collaboration, enhance the transparency and accountability of government organisations, and facilitate economic value from data. Another objective of the initiative is to transform the public sector into a profit-making sector. Overall, open data initiatives are intended to promote efficiency and effectiveness in government organisations (McDermott, 2010).

McDermott (2010) argues that transparency is a primary factor in promoting the accountability of the government to the public. Citizens and public engagement with the government through OGD ensures better decision-making processes. Technological tools are used to enhance collaboration between the public and government organisations. Thus, OGD initiatives are adopted at the national level through data portals and different regional and government organisations' portals to foster collaboration. Furthermore, Janssen *et al.* (2012) argue that the government uses open data to reinforce existing structures by providing only selected data that promotes the legitimacy of government organisations. This is a valid argument if the government does not open all the data, and requires different institutional arrangements such as *right to information* acts.

Open data initiatives not only increase government transparency but also allows citizens to provide feedback to the government; citizen engagement through eParticipation can increase the efficiency of government operations (Janssen, 2011; Janssen *et al.*, 2012; Keen *et al.*, 2013; Bertot *et al.*, 2014; Mellouli *et al.*, 2014). One of the objectives of smart government is to achieve efficiency by sharing data among government organisations. Thus, some developed countries have extended their open data objectives to include data sharing between public organisations, such as members of the EU's "Europe 2020 digital agenda" (Carrara *et al.*, 2015). From this perspective, OGD is not limited to sharing data sets with the public, but also encompasses other public sector organisations. This process offers a

broad view of open linked data, which fundamentally includes advanced business analytics of large data sets.

Achieving and sustaining competitive advantage is not only limited to profit-making organisations; public sector organisations also seek the same objectives in the form of inter-agency competition (Matthews and Shulman, 2005). In recent years, with the increasing accumulation of data generated by different means and sources, many organisations including those in the public sector are seeking to implement OD initiatives to achieve competitive advantage and efficiency (Bertot *et al.*, 2014). The primary driver behind OD initiatives in many organisations is to reach a consensus on how data can create value for the organisation.

Minimising the digital divide between developing and developed countries is another factor favouring the adoption of open data initiatives, as data availability and analytical experience in the latter. In contrast, Janssen *et al.* (2012) asserted that open data would widen the gap of the digital divide within a country, as the capability of analysing the data is limited to those who have the skills and techniques to use the data. This argument applies especially to developing countries which lack expertise and knowledge.

2.2.4 Open-linked data

Although open data is objectively new within academic communities, many scholars have addressed issues of big data and open data independently (Janssen *et al.*, 2012; Tinati, 2013; Barry and Bannister, 2014; Mellouli *et al.*, 2014). Some indicate the importance of OGD eventually becoming big data, as this is a massive resource and value can be created from large data sets (Keen *et al.*, 2013; McDonald and Léveillé, 2014). This involves the concept of open-linked data, where organisations link the open data available from different sources to generate value and make sense of the analysis provided to the decision makers.

Open data is in the interest of external entities, whereas big data is of advantage to the individual organisation or group of organisations (McDonald and Léveillé, 2014). Nevertheless, open data and big data are intertwined in many aspects, as government organisations can produce big data and making their open-linked data accessible to the public with economic benefits. Figure 2.1 shows the relationship between open data and big data (Gurin, 2013, 2014).

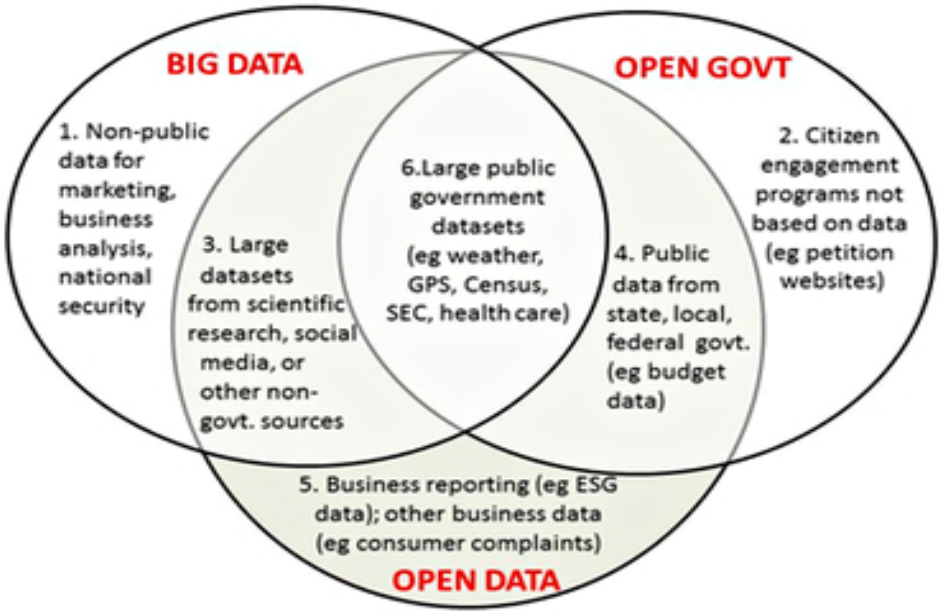

Figure 2.1 Big Data vs Open Data (Gurin, 2013)

Open-linked data connects all the datasets, whether structured or non-structured, in one space to generate a better understanding of the information and generate higher value to the public (Janssen *et al.*, 2012). Figure 2.2 depicts the relationship between open data and linked OGD. The OGD is related to two dimensions of open data and open linked data. Therefore, this research is positioned at the intersection of the Government Data and Open Data areas as illustrated in Figure 2.2. The Oman OGD includes the government data that are at the custody of the Omani government organisations that encompasses the open data. However, the linked data is not included in this research as the initiative in the first stage of adoption of linked data is considered an advanced aspect of Open Data.

Open-linked data and big data are dimensions of one ecosystem in terms of size and complexity, although under-represented in the literature on empirical studies (Weerakkody *et al.*, 2017b; Lnenicka and Komarkova, 2018). Moreover, McDonald and Léveillé (2014) argue that the differences between open data and big data are in the objectives of the data and the communities and audience for the data.

Open-linked data revolutionised the open data era as it represents another dimension for open data users to utilise data from various open sources (Kitchin, 2014). The value of open-linked data allows interactions between government organisations, citizens, and the private sector to facilitate valuable insights from multiple data sets to transform into actionable information and generate commercial and social value (Janssen *et al.*, 2012; Attard *et al.*, 2015; Lnenicka and Komarkova, 2018).

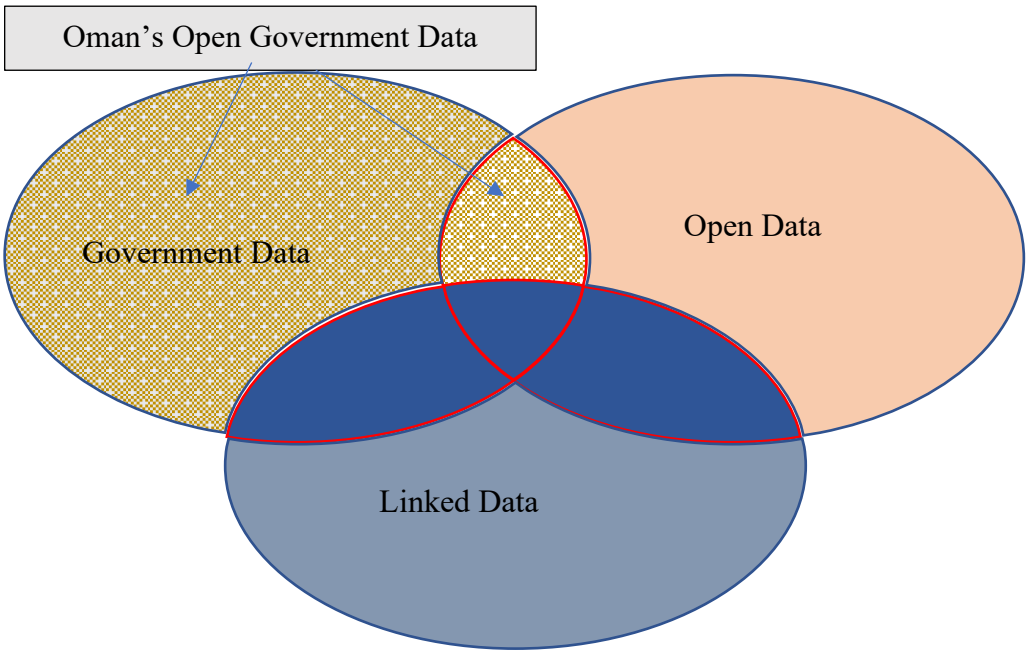

Figure 2.2 Open Linked Data Classifications (Adapted from Janssen et al., 2012)

2.3 Open Government Data from the e-Transformation perspective

At the early stage of the eGovernment initiatives, the focus was on increasing efficiency and productivity in a decentralised manner. However, with the emergence of web technologies eGovernment initiatives generates better value by integrating vertically and horizontally the electronic services of the government (Yildiz, 2007). Doty and Erdelez (2002) argue that an open government is one of the crucial areas within the eGovernment domain. Likewise, the OGD initiative is considered as a subset of e-transformation initiatives in the IS domain in many countries, including the case of Oman (Attard *et al.*, 2015).

There is a wealth of e-transformation research since the movement started to focus on eGovernment initiatives, and Government 2.0 trend (Doty and Erdelez, 2002; Al-Mamari *et al.*, 2013). Many countries, including developing economies, have established e-transformation programmes in order to move government operations from paper-based to electronic transactions. The e-transformation implies the shift of the concept from the ICT automation of eGovernment to a participatory and open concept of government (Manuel Pedro Rodríguez *et al.*, 2010). The e-transformation considers the understanding of technological and institutional contexts in achieving the efficient and value-added

transformation of the digital services (Orlikowski and Barley, 2001). Therefore, the OGD initiative aims to transform the government into an openness era through the e-transformation paradigm.

Despite OGD being part of e-transformation initiatives, the OGD initiatives differ in several aspects. Open government initiatives present a new form of government openness that engages with the public through technological collaboration. Thus, OGD initiatives are a "*political arena in which social forces external to the government claim a larger role in the society animated by progress in IT*" (Pyrozhenko, 2017, p. 149). Moreover, OGD initiatives involve different government organisations that seek to utilise public knowledge to create value and encourage innovation; they do not protect their organisational knowledge boundaries. Thus, open government in the era of digital government contradicts the Weberian model which assumes that knowledge should be protected and remain within the organisation's confines (Luna-Reyes *et al.*, 2014; Pyrozhenko, 2017).

Unlike eGovernment initiatives, the political aspect of OGD initiatives is one of the vital pillars for the success of OGD (Janssen *et al.*, 2012; González-Zapata and Heeks, 2017). The literature suggests that political impediments are not as significant as the managerial and cultural impediments in eGovernment initiatives (Ramon Gil-Garcia *et al.*, 2007; Gil-Garcia and Sayogo, 2016). The OGD initiative facilitates information sharing between government organisations in terms of open linked government data (Janssen *et al.*, 2012; Attard *et al.*, 2015; Lnenicka and Komarkova, 2018). Thus, they share common characteristics with information-sharing projects in eGovernment. Although OGD facilitates inter-organisational interaction in a similar way to information-sharing projects, OGD initiatives are distinct in terms of their political aspects (González-Zapata and Heeks, 2017). Therefore, the OGD initiatives literature is not fully linked with eGovernment, and this research follows the same pattern.

2.4 Institutional Arrangements of Open Government Data Initiatives

Several OGD initiatives have been introduced around the world as part of the Open Data movement. However, several essential aspects need to be addressed in the institutional environment of these initiatives. Several scholars have addressed the need to establish a different framework considering aspects such as transparency, engagement, legal, technical, social, and economic issues (McDermott, 2010; Lnenicka and Komarkova, 2018). An example is the open government maturity model of Lee and Kwak (2012) that proposes a

linear approach to implementing open data. The cultural aspect is recognised at all stages. However, the literature is inconclusive on how OGD adoption in early stage is conceptualised at the national level.

Several scholars have addressed OGD from the perspectives of the citizen (Weerakkody *et al.*, 2017b), policies (Zuiderwijk and Janssen, 2014; Nugroho *et al.*, 2015), complexity, security, ethics and privacy issue (Tankard, 2012; Bertot *et al.*, 2014; Gang-Hoon *et al.*, 2014). To the researcher's knowledge, few studies have addressed OGD from the institutional perspective. This research therefore addresses OGD initiatives from the institutional perspective, and in particular from the institutional logics perspective (Thornton *et al.*, 2012).

This research highlights OGD initiatives in developing countries that need to be addressed from the organisational perspective, especially institutional logics, rather than from a technical perspective. This includes paradigms for roles and responsibilities, laws and regulations, ownership and control, and capabilities. OGD initiative perspectives encompass the cultural elements and agency factors within each issue.

Conducting institutional analysis is incomplete without considering the institutional arrangements (Hollingsworth, 2000). Institutional arrangements address how different arrangements and governance are incorporated to coordinate different actors in the institutional environment. The institutional arrangements comprise of markets, different types of hierarchies and networks, associations, state, communities and clans (Hollingsworth, 2000; Hollingsworth and Lindberg, 1985).

In this research, the institutional arrangements relate how OGD initiative is structured in the institutional environment. This involves the roles and responsibilities of designated organisation at the national level that administer the OGD initiatives, laws, regulations, and data ownership that govern the OGD institutional environment, and the capabilities of the structural elements embedded in different practices in the institutional environment of OGD initiative (Hollingsworth, 2000; Nugroho *et al.*, 2015; Abu-Shanab, 2015).

2.4.1 Roles and Responsibilities Paradigm

The *organising vision* concept is introduced, and defined as "A vision for organizing in a way that embeds and utilizes information technology in organizational structures and processes" (Swanson and Ramiller, 1997, 460). OGD initiatives at the early stage of

adoption, mandate the organising vision at the stage of *comprehension* (Swanson and Ramiller, 2004; Currie, 2009). This entails motivations and alignment between the initiative's desired objectives and national objectives to shape actors' behaviour to achieve appropriate responses (Oliver, 1991). The organising vision at the comprehension stage of the OGD is to align the initiative vision from different stakeholder to ensure aligned strategy in adopting the OGD at the initial stage. The alignment implies a coherence, harmony, and consensus in adopting the OGD. Therefore, the organising vision is a crucial point in the early stage of an OGD initiative, ensuring sufficient adoption and innovation diffusion in the following stages (Currie and Finnegan, 2011).

In the recent empirical study of national health care IT implementation in a North European country (Bunduchi *et al.*, 2019), the results indicated that the institutional logics (Thornton *et al.*, 2012) and organising visions (Swanson and Ramiller, 1997; Currie, 2009) changed the IT implementation as the project progressed in stages. Thus, the coherence of the organising vision among different stakeholders throughout space and time is an essential factor in large national IT projects such OGD to address the actors' different responses to the institutional logics (Oliver, 1991).

According to Chandler (1990, p. 13) *strategy* is "the determination of the basic long-term goals of an enterprise, and the adoption of courses of action and allocation of resources necessary for carrying out these goals". Following the organising vision stage, organisations frame a strategy for adopting the initiative to ensure the structural transition to the desired state (Cooper and Zmud, 1990; Swanson and Ramiller, 2004). Thus, the government needs to assign a designated organisation(s) with appropriate roles and responsibilities to implement the initiative. OGD initiatives are organised in similar ways to any eGovernment initiative. However, the institutional complexity of OGD entails different structural elements and materials in the institutional environment (Scott, 2008; Greenwood *et al.*, 2011).

Nugroho *et al.* (2015) asserted in their comparative study of open data initiatives across five countries that there is a need for a designated organisation for OGD implementation at the national level. Assigning a designated organisation creates a clear map and systematic approach to the process of publishing data; however, the allocation of adequate empowerment to the selected organisation is another dimension that needs to be addressed in national initiatives (Hollingsworth and Lindberg, 1985; Hollingsworth, 2000; Abu-Shanab, 2015).

Information technology allows OGD initiatives to transform the national culture in the interests of transparency, accountability and economic growth (Gonzalez-Zapata and Heeks, 2015). Therefore, the national strategy for OGD is essential at the start of the organising vision stage (Swanson and Ramiller, 1997). A case study of implementing open data in the city of Vienna highlighted the role of strategy as a national governance mechanism (Parycek *et al.*, 2014). The alignment of the open data strategy with the overall business strategy and objectives generated better value (Gregor *et al.*, 2007). Therefore, an objective of the open data strategy is to achieve the aims of the national strategy in stimulating the open data objectives.

Visualising the roadmap of the national initiatives is considered a success factor as it sets the direction of the initiatives in the future. The roadmap is an interpretation of appropriate planning that transforms the vision and mission statement at the strategy level, with the objective to bridge the gap between the organisation's capabilities and technology (Phaal *et al.*, 2004; Gichoya, 2005). Therefore, the strategic direction and support of senior management allow the strategy to produce the desired outcome of OGD initiatives at the national level (Gichoya, 2005; Pardo *et al.*, 2012). The literature suggests that public organisations adopt different strategic management approaches (Wechsler and Backoff, 1986). Jarvenpaa and Ives (1991) concluded that executive involvement and participation are essential factors that accelerate the adoption and implementation of information technology in large organisations. Consequently, the institutional entrepreneur's role is vital in bringing about the radical change introduced by disruptive technology such as open data. This radical change stems from the digital transformation from traditional operations to the new perspective of disruptive technologies (Fathul and Maung, 2013; Hardy and Maguire, 2017; Hinings *et al.*, 2018).

2.4.2 Laws, Regulations and Policies Paradigm

Regulations and laws are interrelated terms used in the literature, and include those established by a government organisation to enforce specific behaviour on other government organisations. Hood *et al.* (1998, p. 61) defines regulations as "The way public organisations are subject to influence from other public organisations operating at arm's length from the direct line of command and endowed with some sort of authority over their charges". Regulations are classified into three main categories, economic, social and process; the process regulations are to manage government operations in the public and private sectors

(Guasch and Hahn, 1997). Thus, the OGD regulation is to control the processes at the national level to enforce acceptable norms and behaviours by government organisations.

Policies define actionable processes and procedures that interpret the laws and regulations in the institutional environment. Anderson (1990, p. 5) defines policy as "a purposive course of action followed by an actor or set of actors in dealing with a problem or matter of concern". Policies are developed to resolve societal issues at the institutional level. Therefore, collaboration between government organisations is essential to formulate unified policies for the open data (Zuiderwijk and Janssen, 2014).

Schermann *et al.* (2014) asserted that legal guidelines in terms of privacy and data security need to be considered when adopting a national initiative. Open government initiatives must establish all the related laws to support the initiative at the national level. Freedom of Information and Rights to Information acts are crucial foundations for OGD (McDermott, 2010). Laws and regulations are developed and defined at the national level to support the operational processes and activities at the institutional level.

Countries establishing OGD initiatives require appropriate legislative foundations to support the initiative at the national level, and to support the government organisations in releasing and publishing data. Several laws and regulations are required to support data openness. Developing countries tend to lack the fundamental laws and regulations in support of OGD, which are considered essential in developed countries (Guasch and Hahn, 1997). Freedom of information acts, for example, allow government organisations to open their data to the public. This legislation involves a political dimension, as it affects other aspects giving citizens access to government data (Nugroho *et al.*, 2015).

Government organisations are required to publish government information online. However, this is not without consideration of privacy, security and confidentiality issues. The publishing of government information should be updated on a timely basis to avoid any transparency issues that may arise from outdated information. Thus, a privacy act is an important regulation that allows government organisations to open their data without affecting the privacy of individuals and the public (Zuiderwijk *et al.*, 2015; Wang *et al.*, 2019).

The Freedom of Information Act in the USA highlighted nine different regulations for exemption from the open data licence, illustrating the complexity of OGD legislation. As open data policies and regulations are complex they require close collaboration between all

stakeholders involved, in order to ensure the effective use of the limited resources of government organisations (Zuiderwijk and Janssen, 2014).

Appropriate foundations for all the related laws and regulations are necessary to establish the soundness open data policies. However, existing regulations and policies act as constraints to formulating new policies to address new initiatives (Yang *et al.*, 2015). As OGD initiatives are primarily to generate value from the data, open data policies and practices need to be aligned with the needs of the public beneficiaries of the data to reflect a single ecosystem (Dawes and Helbig, 2010; Dawes *et al.*, 2016). Zuiderwijk and Janssen (2014) empirical study compared seven Dutch government policies and found a misalignment between the data policies and users as the policies focused on internal challenges.

In the context of developing countries, Shkabatur and Peled (2016) study of the open data policies of five developing countries revealed that the policies were not institutionalised at the early stage of adoption. They argued that the reason was the lack of incentives for the government organisations to comply with the policies. The study also revealed that developing countries are subject to external pressure from international organisations which focus on short-term results that are not aligned with national government organisations.

Laws and regulations related to open data have undergone several updates in the USA, and it is inevitable that open government will not succeed without periodical reviews and updates of the laws and regulations that support it. Moreover, engaging the public in rulemaking is an essential element to obtain a public endorsement (Clarke and Margetts, 2014; Weerakkody *et al.*, 2017a).

In developing countries, empirical studies indicate government concern that open data might affect citizens' perceptions of the government (Nugroho *et al.*, 2015); they are therefore reluctant to establish different laws and regulations to support data openness. A comparative study of open data policies in developing and developed countries showed an absence of legislation for open data in developing countries (Nugroho *et al.*, 2015). Policies are established and developed in an uncertain environment is a recipe of failure to act to the situation. That is, developing countries react differently to open data as a disruptive technology (Dunn, 1981; Zuiderwijk and Janssen, 2014).

Developing countries are therefore reluctant to imitate the policies applied in developed countries. The use of open data policies in other sectors might result in neglecting to take

into account the differences in the environments in which the organisations are operating (Chen *et al.*, 2006; Zuiderwijk and Janssen, 2014).

2.4.3 Data Ownership and Control Paradigm

Since the initiatives introduced by the Obama administration in 2009, governments around the world have been inspired by the social and economic value of open data. However, these initiatives are not always able to achieve tangible benefits, especially in developing countries (Open Knowledge, 2014). The closed government culture is one of the barriers to adopting and implementing OGD initiatives, where fear of criticism from the public is the primary motive for government organisations withholding data (Van Alstyne *et al.*, 1995; Evans, 2011; Kostkova *et al.*, 2016).

Fear of criticism is a form of ownership and control as governments in developing countries are less open than those in developed countries, as in the case of Kenya's OGD initiative (Kenei, 2012). Despite governments considering open data as a means of establishing collaboration with the public, the level of engagement varies according to the level of bureaucracy and acceptance of democracy (Kenei, 2012; Kassen, 2017).

Governments face challenges and pressure from the public in terms of social expectations of government openness of data (Wang and Lo, 2016). OGD is at risk of different interpretations by the public, increasing government caution. The fear of criticism from the public is especially strong if the data quality does not meet by public expectations. The value of data is only realised when the data is of good quality and generates revenue to the public (Luna *et al.*, 2014). This challenges organisations to ensure data is derived from reliable and accurate sources, adding another challenge as the sources of data are multifaceted and require horizontal and vertical integration (George *et al.*, 2014).

Withholding and controlling data assets gives certain government organisations power; this is diluted when data openness shares that power with others (Van Alstyne *et al.*, 1995). The prospect of losing the privileges of data power discourages organisations from sharing and publishing their data with the public. Similarly, opening up the data to another government organisation might jeopardise the distribution of power between them (Jaeger, 2002).

In addition to the fear of criticism and loss of privileges by government organisations, data ownership is another aspect that has not been addressed sufficiently. Data ownership begs the question "Who owns what?" It has been discussed in the literature on the Internet of

Things (IoT), big data (Van Alstyne *et al.*, 1995; Kankanhalli *et al.*, 2019), health data (Evans, 2011) and open data use (Susha *et al.*, 2015). The ownership of OGD is a challenging factor in terms of intellectual property rights and health, and is considered as a barrier to OGD (Evans, 2011; Kostkova *et al.*, 2016; Weerakkody *et al.*, 2017b).

OGD is generated from diverse sources, further complicating the data ownership issue. Government organisations are reluctant to open data that is sourced from another organisation. Thus, legislative classification of data ownership is required to regulate the issue and to achieve interoperability between government organisations (Pardo *et al.*, 2012). Conradie and Choenni (2014) suggest that *opaque ownership* of non-personal data inhibits local governments from disclosing data to the public.

2.4.4 Open Government Data Initiative Institutional Capabilities Paradigm

OGD initiatives in the institutional environment are categorised into organisational and non-organisational capabilities (Pardo *et al.*, 2012). Organisational capabilities stem from the *organisation's readiness* to adopt and implement OGD (Hossain and Chan, 2015). However, organisational culture is an integral part of data openness, influenced by financial, bureaucratic and primarily cultural constraints (Zhao and Fan, 2018).

National OGD initiatives are complex in nature and involve diverse organisations in the institutional environment. The adoption of OGD projects by the public sector is structurally complex, as many stakeholders have different goals and objectives in creating value from the data; for example, security organisations may focus only on the security aspect. In contrast, the goal of health organisations is to use data to achieve better health services for the community (Wilkin *et al.*, 2013).

Although government organisations are part of one institutional environment, organisational readiness varies between different departments at the level of technological penetration and diffusion (Hossain and Chan, 2015). Hossain and Chan (2015) study investigating the Australian OGD suggests that although larger organisations have more resources to support the initiative, large government organisations are less innovative in adopting the technology.

Moreover, innovative technologies require extensive skilled human resources to handle OGD initiatives, and organisations already harnessing advanced technology are better situated (Hossain and Chan, 2015; Zhao and Fan, 2018). Inability to obtain the necessary skills and knowledge hinders the adoption of OGD and introduces knowledge barriers

(Fichman and Kemerer, 1999). The objective of OGD initiatives is to create value for the organisations and public sector triggered by the innovative technology, but stipulating tight and adaptive coupling between organisations' IT professionals and top management (Sambamurthy and Zmud, 2000).

Scholars acknowledge technological readiness as one of the success factors in complex initiatives such as OGD (Pardo *et al.*, 2012; Hossain and Chan, 2015; Gil-Garcia and Sayogo, 2016). Pardo *et al.* (2012) defined four dimensions of technological readiness: secure environment, technology acceptance, technology knowledge and technology compatibility. This implies an ICT infrastructure that is capable of supporting OGD (Nugroho *et al.*, 2015).

2.5 The gap in information systems literature on Open Government Data

The literature in the information systems research on OGD studies is scant, and most of the empirical studies have been conducted in developed countries (Elbadawi, 2012; Shkabatur and Peled, 2016; Davies and Perini, 2016). Table 2.4 shows the areas on which open data research focuses, with topics addressed from the following perspectives: socio-technical (Janssen *et al.*, 2012; Zuiderwijk *et al.*, 2012a; Zuiderwijk and Janssen, 2014; Zuiderwijk *et al.*, 2015); technical, mainly in open linked data (Paulheim and Fümkranz, 2012; Lausch *et al.*, 2015; Wu *et al.*, 2018); socio-political (González-Zapata and Heeks, 2017); policy (Zuiderwijk and Janssen, 2014; Bates, 2014; Chatfield and Reddick, 2018); open data use (Zuiderwijk *et al.*, 2015); and value (Janssen, 2011; Janssen *et al.*, 2012; Keen *et al.*, 2013; Bertot *et al.*, 2014; Mellouli *et al.*, 2014). The peer-reviewed literature shows that very few studies have addressed OGD adoption at an early stage (Wang and Lo, 2016).

Table 2.4 Open Government Data Research Focus Areas

DIMENSION	DESCRIPTIONS / FINDINGS	LEVEL OF ANALYSIS/RESEARCH METHOD	REFERENCES
SOCIO-TECHNICAL	• Identifies benefits of open data from political and social, economic and operational and technical perspectives. • Identifies barriers to open data from institutional, task complexity, use and participation, legislation, information quality and technical perspectives.	National level in the Netherlands	(Janssen *et al.*, 2012)
	• Identifies open data process impediments from users' perspectives. • Barriers to open data process in ten categories: 1) availability and access, 2) find ability, 3) usability, 4) understand ability, 5) quality, 6) linking and combining data, 7) comparability and compatibility, 8) metadata, 9) interaction with the data provider, and 10) opening and uploading.	Qualitative study at users' level , investigated empirically from established open data in Austria, USA, Greece and Norway.	(Zuiderwijk *et al.*, 2012a)
TECHNICAL PERSPECTIVES	Discusses the potential of data mining in open linked data and suggests a number of existing data-mining techniques and related tools in the applications of open linked data in different research areas.	Qualitative study; identifies data-mining methodology	(Lausch *et al.*, 2015)
	Discusses the applicability of data-mining techniques to discover knowledge from open data related to Taiwan's dengue epidemic. Findings suggest that location and date (month) in open data show the highest classification power followed by climate variables (temperature and humidity), whereas gender and age show the lowest values.	Quantitative study of 70,914 cases in Taiwan	(Wu *et al.*, 2018)

	Presents an automatic approach to generating features by enriching data from linked open data. Identifies six different types of feature generators encompassed in the open source tool FeGeLOD.	Four case studies	(Paulheim and Fümkranz, 2012)
POLICIES	• Develops a framework for comparing open data policies. • Argues that an open culture is essential in implementing open data policies. • Key motivations to develop open data policies are diverse between government organisations. • Government organisations need to considers the industry they operate in rather than mimicking each other's policies • There is a gap between the objectives of the open data policies which reflects the ambitions of politicians and the complexities public government organisations face. • Argues that collaboration of government organisations improves open data policies.	Qualitative study comparing the open data policies of seven Dutch government organisations at the national, ministerial and lower levels of bureaucracy.	(Zuiderwijk and Janssen, 2014)
	Strategic implementation of information policy by governments in the exercising of state power, and the development of the 'informational state'.	Qualitative study, interviews with policy senior officials and local government officials	(Bates, 2014)
	Diffusion of OGD policy innovations and the characteristics of the early adopters .	Quantitative analysis of OGD policy documents in seven Australian federal and state governments in Austria	(Chatfield and Reddick, 2018)
USE OF OPEN DATA	• Determines predictors influencing the acceptance and use of open data technologies.	Quantitative method applied by using questionnaire	(Zuiderwijk *et al.*, 2015)

	• Argues that the predictors performance expectancy, effort expectancy, social influence, facilitating conditions and voluntariness of use together account for 45% of the variability in people's behavioural intention to use open data technologies. • Argues that policy makers should increase the acceptance and use of open data technologies by: 1) Presenting the benefits of open data use 2) Making users aware that they are already using open data 3) Developing social strategies to encourage people to stimulate each other to use open data 4) Integrating open data use in daily activities 5) Decreasing the effort necessary to use open data technologies.	completed by researchers, citizens and civil servants from the social science domain in various countries	
OPEN DATA ADOPTION	• Develops a research model that integrates the technology–organization–environment (TOE) framework; the following four factors are central to adoption decisions: perceived benefits, perceived barriers, organisational readiness, and external pressures. • Argues that there is significant positive relationship among perceived benefits, organisational readiness, and external pressures. • Asserts that longitudinal studies are needed to observe government organisations' continuous or discontinuous adoption of OGD.	Qualitative study of OGD adoption among government organisations in Taiwan	(Wang and Lo, 2016)

	• Reviews the strengths and weaknesses of OGD in the Gulf Cooperation Council (GCC) from the four models of Sieber and Johnson (2015). • Identifies challenges to OGD implementation in GCC countries. • Argues that there is a need to establish a separate ministry or public agency to look into the IT infrastructure and funding of the OGD implementation.	A qualitative approach to explore the OGD portals of the GCC countries (Bahrain, Kuwait, Qatar, Oman, Saudi Arabia and the United Arab Emirates (UAE))	(Saxena, 2017)
OPEN DATA VALUE	• Discusses open data value from the perspective of citizen engagement and public eParticipation. • States several values for open data such as transparency, increased government efficiencies, increased accountability.	Qualitative studies; literature review	(Janssen, 2011; Janssen *et al.*, 2012; Keen *et al.*, 2013; Bertot *et al.*, 2014; Mellouli *et al.*, 2014)

The literature shows that most of the studies in developing countries focus on sub-national level adoption and implementation, as illustrated in Table 2.5. This focus results from the de-centralisation/centralisation approach adopted by developing countries towards OGD. There is little information on national-level context studies due to the complexity of national-level initiatives (Fossestøl *et al.*, 2015; Davies and Perini, 2016).

Table 2.5 Open Data sub-national case studies in developing countries – (Adapted from (Canares and Shekhar, 2016))

Country	Title of Study	Authors	Sector/Theme	Sub-national Area
India	The Quality of Civic Data in India and the Implications for the Push on 0pen Data	Shekhar, S. and Padmanabhan, V.	Health	Chennai (city)
Uruguay	Opening Cities: Open Data in Montevideo	Scrolini, F.	Urban development/ Cities	Montevideo (city)
Brazil	Open Government Data in Rio de Janeiro City	Matheus, R. and Ribeiro, M.	Urban development/ Cities	Rio de Janeiro
Kenya	Open Government Data for Effective Public Participation	Chiliswa, Z.	Poverty and slums	Nairobi (city)
Philippines	Exploring the Role of Open Government Data and New Technologies: The Case of the Philippines	Ona, S., Ulit, S., Ching, M., Hecita, I., Padilla, T. and Angeles, S.	Health and economic development	Bacolod, Bago, Iligan, Iloilo (cities)
Brazil	Open Data in the Legislative: The Case of Sao Paulo City Council	Matheus, R. and Ribeiro, M.	City governance – legislation	Sao Paolo (city)
Argentina	Opening Cities: Open Data in Buenos Aires	Fumega, S.	Urban development/ Cities	Buenos Aires (city)
Philippines	Opening the Gates: Will Open Data Initiatives Make Local Governments in the Philippines More Transparent?	Canares, M., De Guia, J., Arawiran, J. and Narca, M.	Fiscal transparency	Bulacan, Bohol, South Cotabato (provinces)
Brazil	Measuring Open Data's Impact of Brazilian National and Sub-national Budget Transparency Websites and its impact on People's rights	Beghin, N., Zigoni, C.	Fiscal transparency	Sao Paolo (city)

The literature of OGD focuses on its impact and capacity-building instead of the institutional aspects (Davies and Perini, 2016; González-Zapata and Heeks, 2017), although a number of studies have used an institutional lens from different perspectives in the OGD research (Egger-Peitler and Polzer, 2014; van Schalkwyk *et al.*, 2015; Bentley and Chib, 2016; Kornberger *et al.*, 2017; González-Zapata and Heeks, 2017; Safarov, 2019) .

The literature shows few studies applying the institutional lens in investigating OGD and even fewer applying institutional logics at the national level. A recent study by González-Zapata and Heeks (2017) of Chile's OGD initiative investigated the historical influence of digital government and argued that the OGD institutional path was subject to de-institutionalisation and politicisation. They identified a gap in applying institutional logics

to understand the interaction of dominant institutional logics from OGD-related institutions. The literature also shows a gap in using certain theories for OGD when applying institutional logics perspectives to reveal the institutional practices that enable/hinder the implementation of national OGD (Zuiderwijk *et al.*, 2015; González-Zapata and Heeks, 2017). Therefore, this research address the gap in the literature by using the perspective of institutional logics (Thornton *et al.*, 2012) and apply it at national level. Table 2.6 summarises different studies that address open data seen through different institutional lenses.

2.6 Summary

This chapter critically reviewed the literature on OGD and various perspectives of the initiative. It highlights the OGD movement and the definition of open data (Open Knowledge Foundation, 2012) and OGD (OECD, 2015). Value, motivations and barriers of open data and open-link data initiatives are illustrated from an organisational and institutional perspective. The institutional perspective highlights different aspects of open data related to organisational studies seen from the organisational rather than technical perspective through the lens of institutional logics. The chapter concludes by addressing the gap in the literature in applying institutional logics perspectives to OGD phenomena at the national level.

Table 2.6 Open Government Data and Institutional Lens

Study	*Context*	*Methodology*	*Institutional Lens*	*Findings*
(Egger-Peitler and Polzer, 2014)	Coherence of European strategies and national implementations concerning the reuse of public sector information in Vienna's open data initiative.	Qualitative methodology through semi-structured interviews	Institutional isomorphism	Suggests that there is a decoupling of supranational strategies (EU) and national implementation activities. Argues that reluctant attitude of Austrian federal and administrative culture are the reasons for the decoupling. Mimic isomorphism dominates the initiative.
(Kornberger et al.*, 2017)*	Empirically traces the complexities between bureaucracy and open government; and theorises the rationalisation of public administration in terms of bureaucratic challenges in the case of Vienna.	Qualitative, semi-structured interviews with 14 interviewees	Drawing on Weber's conceptualisation: bureaucratic ideal-type.	• Argues that rationalisation and bureaucratisation are not unilinear processes that reorganise all spheres of life univocally. • Argues that new technology such as OGD leads to new forms of bureaucratisation • Suggests further empirical research on the relations between politics, bureaucracy, and technology.
(González-Zapata and Heeks, 2017)	Analyses the institutional environment and investigates the historical influence of digital government policies and institutions on the development of OGD initiatives.	Qualitative research by interviewing 50 key actors involved in digital government and OGD in Chile	Uses Scott's institutional pillars and path dependence theory to investigate institutional trajectory	• Suggests OGD initiatives are at risk of becoming one-off projects rather than long-term transformative policies. • Suggests that OGD institutional path is subject to de-institutionalisation and politicisation of ICTs due to lack of support or strong institutional framework such as regulations, long-term resources and political support • Institutional path of emphasis on quick-win initiatives rather than long-term policies Institutional nature of OGD is embedded in existing, long-term institutional politics

(Styrin et al.*, 2017)*	Analyses the institutional environment where OGD initiatives are implemented and acknowledges the role of these ecosystems in shaping current OGD outcomes.	Comparative approach of OGD ecosystems in Mexico, Russia and the USA	Institutional process	Suggests that national open data project depends on political leadership and the inclusion of authoritative open data experts and civil society activity.
(Safarov, 2019)	Investigates the institutional dimensions that shape OGD implementation.	Qualitative study with 32 interviews in three developed countries: Netherlands, Sweden, and UK.	Applies discursive institutionalism (Schmidt) to explain the interaction of policy-relevant ideas, discourse, and institutions.	• OGD implementation as such is not enough to ensure the sustainability and success of its adoption. • Identifies five institutional dimensions that contribute to OGD success: policy and strategy, legislative foundations, organisational arrangements, relevant skills, public support and awareness. • Suggests that centralised OGD governance yields to higher level of OGD implementation success.

Chapter 3 : Institutional Theory and Institutional Logics - Theoretical Perspective

3.1 Introduction

The previous chapter critically reviewed the literature of OGD through the lens of information systems and organisational studies. This chapter highlights institutional theory to study the phenomena of OGD adoption at an early stage, proposing institutional logics as an appropriate theory to shed light of OGD adoption in developing countries. It comprises seven main sections covering different institutional perspectives. The first reviews the literature on institutional theory, seminal work and its foundations. The second section discusses in-depth of institutional logics perspective and the main principles of the metatheory. This chapter considers the suitability of institutional logics metatheory as a lens through which to investigate the OGD phenomena.

The third section highlights multiple facets of institutional theory that contribute to the research. The fourth section identifies the gap in the literature in applying institutional logics in the IS domain. The penultimate section presents a conceptual framework to address the phenomenon of OGD in developing countries, and the last section summarises the chapter.

3.2 Institutional Theory

Due to the dynamic pace in the business environment that affects the institution's survival and existence, several scholars have used different theories to interpret and evaluate how institutions survive in this environment, uncovering the forces and pillars that facilitate survival with the objective of attaining legitimacy (DiMaggio and Powell, 1991; Scott, 2011; Thornton *et al.*, 2012; Scott, 2014). This section defines what the institution is and reviews institutional theory.

3.2.1 Definition of Institutions

Several scholars have defined institutions from the viewpoint of their own discipline and subfield. The most cited definition of institution is in the seminal work of DiMaggio and Powell:

> The new institutionalism in organization theory and sociology comprises a rejection of rational-actor models, an interest in institutions as independent variables, a turn toward cognitive and cultural explanations, and an interest in properties of supra-

> individual units of analysis that cannot be reduced to aggregations or direct consequences of individuals' attributes or motives.
>
> (DiMaggio and Powell, 1991, p. 8)

Scott (2011) seminal work advanced the institutional theory, which is well recognised in the literature. Scott (2011) defined the institution as :

> Institutions are social structures that have attained a high degree of resilience. Institutions are composed of cultural-cognitive, normative and regulative elements that, together with associated activities and resources, provide stability and meaning to social life. Institutions are transmitted by various types of carriers, including symbolic systems, relational systems, routines and artefacts. Institutions operate at multiple levels of jurisdiction, from the world system to localized interpersonal relationships. Institutions by definition connote stability but are subject to change processes, both incremental and discontinuous.
>
> (Scott, 2011,p. 48)

In the other hand, sociologists like Martin coined the term "social institutions (Martin, 2004). The latter claimed that to define social institutions, some features and criteria that represent them should exist; these are summarised in Table 3.1. Martin (2004) definition argue that the micro- and macro-institutions are not separable, implicitly contradicting Scott (2011) definition of the institution as an organisation. This research uses Martin (2004) definition of the *institution* as it is more comprehensive. Accordingly, this research defines *Oman's government* as an institution embedding different organisations of regulators and government organisations, which represent the unit level of analysis.

Table 3.1 Criteria for Social Institutions (Martin, 2004)

No.	Institutions Criteria
1	Are profoundly social and characterised as a group. Institutions are constituted by collective members of people where an interaction occurs between them
2	Endure/persist across extensive time and geographic space
3	Entail distinct social practices
4	Both constrain and facilitate behaviour/action
5	Have social positions and relationships
6	Are constituted and reconstituted by embodied agent
7	Are internalised by group members
8	Have legitimacy and ideology
9	Are inconsistent, contradictory and rife with conflict
10	Continuously change
11	Are organised in accordance with inherent power
12	Institutions and individuals are mutually constituted; they are not separable into micro- and macro-environments

3.2.2 Overview of Institutional Theory

Institutional theory is rooted in three different scientific fields, economic, political and social, and most institutional studies discuss factors derived from these disciplines. However, technological factors should be added (Orlikowski, 1992), especially in understanding the adoption of the OGD initiative and analysing institutional logics, as technology plays a crucial role in maintaining institutional stability (Baptista *et al.*, 2010).

Scholars from different disciplines widely adopt the use of institutional theory, recognising it as a powerful lens through which to study both individuals and organisations (DiMaggio and Powell, 1991; Dacin *et al.*, 2002; Scott, 2005). Institutional theory studies focus on how organisations can increase their ability to develop and survive in a competitive environment while maintaining a legitimate approach to satisfy stakeholders. Institutional theory addresses the processes that explain why organisations become similar.

Most of the studies in institutional theory focus on how organisations gain legitimacy to achieve their survival (Meyer and Rowan, 1977; Di Maggio and Powell, 1991). Legitimacy is the primary rationale for the institution's existence and survival; however, there is less

emphasis on competition and a desire for efficiencies (Weerakkody *et al.*, 2009). Thus, legitimacy implies cognitive and normative aspects that are not only a matter of values but also of knowledge (Berger and Luckmann, 1967). In the public sector, the rationale of contemporary government organisations is bounded by the desire for efficiencies through digital transformation and eGovernment initiatives (Bertot *et al.*, 2012; Al-Mamari *et al.*, 2013). Therefore, legitimacy has evolved in the public sector where the desire for efficiencies is dominated in the institutional environment.

3.2.3 Multiple Levels of Analysis

Institutional analysis began with an emphasis on culture and cognition analysis (Meyer and Rowan, 1977; Zucker, 1977). The factors outlined in the previous section were subsequently identified. In addition to institutional logics, the institutional theory literature focuses on two streams: macro-level and micro-level. The former leverages the institution's environment as the central conductor of institutional behaviour, whereas the micro stream relates to social aspects of institutions (Berger and Luckmann, 1967; Baptista, 2009; Scott, 2011). Scott (2011) considers an institution as a social system, with a link between the two levels. Thus, the institution can be regarded either as a single entity or as multiple entities within one ecosystem. Therefore, a particular organisation within that ecosystem can be argued as a macro-level representation, whereas other organisations that comply with legitimacy are considered at the micro-level (Greenwood *et al.*, 2014). However, micro-level representation in the complex structure at the national level is not only limited to the subordinate organisations, but can be extended to represent all the stakeholders in the institutional environment. Nevertheless, the micro-level is a significant factor in institutional analysis, offering a clear understanding of why institutional practices and structures are formed as they are (Powell and Colyvas, 2008).

The micro-level stream focuses on social aspects expressed in Berger and Luckmann (1967) seminal work; these authors identified three stages in the institutionalisation processes: *externalisation*, *objectivation* and *internalisation*. Their argument derives from the social aspect and their view of institutionalisation as shared knowledge emanates from the individual to the institutional level which accommodates common belief systems (Berger and Luckmann, 1967; Baptista, 2009). Thus, the social behaviour of an individual at the micro-level triggers the overall social behaviours at the macro-level. Although several scholars recognise this relationship between macro- and micro-levels (Berger and

Luckmann, 1967; Baptista, 2009; Scott, 2011), the impact of this link on the overall societal system as a causal relationship is another aspect that needs to be investigated and explained in the context of the public sector.

3.2.4 The Process of Institutionalisation

Tolbert and Zucker (1999) advanced Berger and Lukmann's work on institutional theory, shaping it beyond the social and micro-level. They identified three sequential stages in the process of institutionalisation: *habitualisation*, *objectivation* and *sedimentation*.

The habitualization process occurs at a pre-institutionalisation stage and contains the innovations that lead to a structural arrangement about specific problems in the organisation. The habitualization is a post-adoptive behaviour by the individuals that reflect a collective intention by the organisation to adopt information systems. The reflection presents a post experiences and cognitive perception about technology and IS usefulness, where the habitualization creates a new structural arrangement to address specific organisation issues or problems.(Jasperson *et al.*, 2005; Currie and Guah, 2007). Within the OGD context, the habitualization occurs at the early stage of promoting the OGD concept and usefulness to the organisation and to the national level.

Objectivation occurs with semi-institutionalisation, implying diffusion of the structure, that is organisational change where decision makers, the leaders in the organisation, play an essential role in achieving legitimacy. The Objectivation stage allows the organisation to use the new structure to achieve greater consensus about the technology or IS. From the OGD context at the national level, the Objectivation stage commence at the creation of OGD portals at the national and sub-national level.

The final stage is the Sedimentation, which occurs when the structures exist for a significantly long period. This implies the institutionalisation is complete and adopted (Tolbert and Zucker, 1999). Contextualising the Sedimentation stage at the OGD initiative, the institutionalisation complete when the OGD adopted by government organisation that frames wider use of OGD at the national level.

3.2.5 Neo-Institutionalism

Di Maggio and Powell (1991) introduced neo-institutionalism; this is based on social theory and considers institutions as independent variables that embody cognitive and cultural

aspects (Di Maggio and Powell, 1991; Powell and DiMaggio, 2012). Di Maggio and Powell (1991) identified three types of organisational mechanism: *coercive*, *mimetic* and *normative*.

Coercive isomorphism stems from formal and informal pressure from other organisations, and social culture and legal requirements. The coercive force can arise from a regulatory organisation, such as the OGD initiative in Oman(Scott, 2014). The regulative element represents the coercive pressure that stems from the role of regulatory bodies and government mandates (Baptista *et al.*, 2010). Institutional mimetic isomorphism comes into play when an organisation imitates other organisations for the pursuit of success. Mimetic pressure occurs when an organisation faces an uncertain environment or when it lacks expertise in specific fields, especially in a complex environment such as the adoption of new technology on the large scale of the public sector (El-Haddadeh *et al.*, 2013). The third type, normative isomorphism, is driven by professionalism and includes the norms and values of the organisation. Normative pressures are generally derived from organisations that are accredited in their professional field, such as regulators (DiMaggio and Powell, 1991; Llamas-Sanchez *et al.*, 2013). The isomorphism pressures are influenced by other factors, such as culture, the role of the *institutional entrepreneur* and the level of empowerment (Tracey *et al.*, 2011; Thornton *et al.*, 2012).

Scott (2011) has contributed to institutional theory, advancing institutional analysis and neo-institutionalism. He identified three pillars or forces of institutions that affect the organisation: *regulative*, *normative* and *cultural-cognitive systems*. The institution's legitimacy is obtained through legal sanctions; therefore, the regulative pillar is associated with rules and sanctioning activities that use a coercive mechanism to ensure proper behaviours. Scott's contribution is by adding the cultural-cognitive aspect, as he argues that for an organisation to survive, it must conform to the norms and belief systems. He argues that institutionalised behaviour (social behaviour) is the consequence of institutionalisation rather than a cause; institutions are subject to change, which can be either incremental or discontinuous.

Scott (2011) considers the micro-stream and argues that institutional theory exhaustively examines social structures in the institutions' environment, such as values and norms, which manage the behaviour of a population of organisations. The study of social structure components entails how they are created, diffused, adopted and adapted over space and time

(Scott, 2005). The formal structure comprises either internal (direct) or external (indirect) organisations that expand the complexity of the environment (Scott, 2005).

In a comparatively contribution to institutional theory, Bromley and Powell (2012) focused on the micro-level in the modern organisation by introducing *decoupling*. Decoupling occurs in the gap between *policy-practices* and *means-ends*. *Means-end decoupling* is expected to increase in an organisation whereas *policy-practices decoupling* is likely to decrease in the new institution. The latter contribution suggests that, if the *policies* are not aligned with the *practices* at the micro-level, the *end outcome does not achieve the means of the adoption*, and the organisation should abandon the project. Few scholars have examined how isomorphism and decoupling interact, although decoupling and isomorphism analysis will contribute significantly to a better understanding of the institution (Boxenbaum and Jonsson, 2017). Conducting an institutional analysis in any organisation requires an in-depth analysis from different perspectives to understand the influence of the cognitive behaviour of the institution that drives institutional change and overall practices in organisations (Dacin *et al.*, 2002; Scott, 2011).

3.2.6 Neo-Institutionalism's limitations - Agency and Structure

Several scholars have criticised institutional theory for not embedding *agency* in the institutionalisation process, establishing the "structure versus agency" debate (Battilana *et al.*, 2009; Bitektine and Haack, 2015). The early institutional theorists considered the actors and agency as subordinate to institutions (Meyer and Rowan, 1977; DiMaggio and Powell, 1983; Battilana, 2006; Abdelnour *et al.*, 2017). However, several empirical studies have identified agency as a causal force; the institutionalist conceptualises the agency role in different terms and concepts that include *institutional work* (Lawrence and Suddaby, 2006; Lawrence *et al.*, 2009) and the *institutional entrepreneur* (Dimaggio, 1988; Tracey *et al.*, 2011; Fathul and Maung, 2013). This critique centres on whether institutional behaviour results from institutional structure at the macro-level or agency at the micro-level (Heugens and Lander, 2009). Institutional scholars also argue that agency is part of the social system. A further debate centres on how individuals relate to the agency (Emirbayer and Mische, 1998; Battilana, 2006). Agency is not limited to individuals, but is enacted within the structural-cultural dimension. Thus, the agency is symbolised as an actor in a contemporary institution, i.e. organisation, tied with resources and social obligations in the institutional environment (Abdelnour *et al.*, 2017). Abdelnour *et al.* (2017) reviewed the literature and

concluded that the agency scholars view actors in four ways: *the wilful actor, collective intentionality, patchwork institutions and modular individuals.*

Advances in intuitional theory consider the micro-level as an embedded agency in the institutional environment (DiMaggio and Powell, 1983; Tolbert and Zucker, 1999; Scott, 2011; Thornton *et al.*, 2012). However, other scholars argue that institutional theory centres around the macro-level. Thus, there is a need for a multi-level theory of the legitimacy process that encompasses both levels, based on the interactions between propriety and validity (Bitektine and Haack, 2015).

In the information systems domain, agency has an important role and is not independent from structure. The interaction between agency and structure is a continuous process that leads to the institutionalisation of the technology when the norms are embedded (Orlikowski, 1992). The institutional logics emphasis the important role of agency in the institutional analysis, therefore; the institutional logics links the macro- micro-level.

3.3 Institutional Logics Perspective

Institutional logics is a primary force in advancing institutional theory; the term was coined by Friedland and Alford (1991). Unlike neo-institutionalism, which focuses on isomorphism and societal systems, institutional logics emphasise the *effects* of different logics that shape the rationale of individuals and organisations. They link the micro- and macro-levels, and addresses the critique of neo-institutionalism (Thornton and Ocasio, 2008).

The institutional logic perspective is an analytical framework which can be applied to any setting of organisations/inter-organisations to understand the relationship between individual and institutional actors in a social system. The institutional logic perspectives includes institutional orders such as the *family, state, corporation, market, professions,* and *religions* (Thornton and Ocasio, 2008). The recent addition of *community* as an institutional order by Thornton *et al.* (2012) has brought the emphasis back to the role of institutional logics not only at the macro-level but also at the micro-level.

Greenwood *et al.* (2014) argue that institutional logics differ from one organisational type to another, and that to understand them it is necessary to analyse organisational differences in different organisational settings. For example, public sector organisations respond differently from family businesses. Thus, the institutional logics perspective can be applied

to any organisational/inter-organisational settings to understand the relationship between individuals and institutional actors in the societal system.

3.3.1 Definition of Institutional Logics

Friedland and Alford (1991) introduced the concept of institutional logic and it was shaped by the work of Thornton and Ocasio (2008) and Thornton *et al.* (2012), which defined the metatheory of institutional logics as:

> Socially constructed, historical patterns of cultural symbols and material practices, including assumptions, values, and beliefs, by which individuals and organizations provide meaning to their daily activity, organize time and space and reproduce their lives and experiences.
>
> (Thornton and Ocasio, 2008, p100)

From this definition, institutional logics combines the structural and normative approaches (Jackall, 1988) and the structural and symbolic approaches (Friedland and Alford, 1991) of institutional analysis, integrating the structural, normative and symbolic aspects (Thornton and Ocasio, 2008). Friedland and Alford refuted the *supraorganizational field* of neo-institutional theory, and instead introduced two terms, *institutional order* and *organizational field* (Friedland and Alford, 1991; Thornton *et al.*, 2012; Greenwood *et al.*, 2014). The integration and duality of use of agency and structure narrowed the gap between the macro- and micro-levels, as the material aspect refers to structure and practices, whereas the symbolic aspect refers to ideation and meaning.

According to the literature reviewed and to the researcher's knowledge, institutional logics at the national level of OGD initiative have not been studied by institutionalists(González-Zapata and Heeks, 2017). This research will therefore shed light at the micro-level on the *cognitive map* described by Scott (2011), which embedded the *end* and *practices relationship* of the actors within the institutional environment (Currie and Guah, 2007; Bromley *et al.*, 2012).

3.3.2 Institutional Logics Types

Institutional logics are categorised into dominant logic and competing logic, where the logic shapes the behaviours and practices of organisations and individuals in the institutional environment (Thornton and Ocasio, 2008; Reay and Hinings, 2009; Scott, 2011; Thornton

et al., 2012). Institutional logics studies focus on how a particular dominant logic influences the practices to predict activities ensuring stability in the organisation (Scott, 2014, 2011).

Institutional competing logics have been widely studied in relation to institutional change (Lounsbury, 2007; Pache and Santos, 2013; Saldanha *et al.*, 2015). The emphasis on institutional logics as a causal relationship, where competing logic is an antecedent or a consequence rather than an explanation of change in the institutional environment (Thornton and Ocasio, 2008).

One of the biggest obstacles to an organisation is reconciling the competing institutional logics, which are interconnected and exist in a variety of multiple logics. However, competing logics can co-exist in an institutional environment, and might constrain the institutionalisation of the dominant logic (Thorén *et al.*, 2018). Hayes *et al.* (2014) conducted an interpretive study on eGovernment IS initiatives in Greece. The study revealed that the logic of IS use in the public sector, which is *citizen-centric-services* logic, was confronted by *bureaucratic* logic. However, the relationship between the new and old institutional logics indicates an affiliation where they co-instituted each other (Hayes *et al.*, 2014).

The shared belief and perceived use of technology endorsed by the organising vision facilitate institutional acceptance in the public sector environment. Bunduchi *et al.* (2019) study of human resource information systems in the public health sector of the NHS UK asserted that *public sector* institutional logic exists in the institutional environment with subordinate professional, corporate and market logics. Therefore, institutional logic can exist as an overarching logic complemented by different institutional logics that interpret the organisation's behaviours. The study also argues that the logics shift during a project's progression from comprehension to implementation, where the actors' organising vision influences the coping behaviours. Current literature often assumes that subordinate logic plays the role of competing logics; however, the subordinate logics act as an enabler to the dominant logic. Moreover, the current literature indicates a gap in addressing the interplay of different logics in a complex institutional environment of multiple organisations (Bunduchi *et al.*, 2019).

Actors respond differently to competing institutional logics, according to reactions and responses that may include ignorance, compliance, resistance, a combination or compartmentalisation (Pache and Santos, 2013). Thus, the interplay of different practices by

actors at different levels is triggered by institutional change. A recent study by Klecun *et al.* (2019), conducted at the national level of electronic health record system implementation in two countries, suggested that stakeholders (actors) can embody a mix of both logics simultaneously. Institutional logic influences stakeholders' behaviours, generating institutional pressures (coercive, normative and mimic) that influence both the stakeholders' and organisation's behaviours (Klecun *et al.*, 2019).

Despite the existence of a dominant institutional logic in the institutional environment, more than one logic can co-exist and guide the behaviour (Thornton and Ocasio, 2008; Reay and Hinings, 2009; Thornton *et al.*, 2012; Scott, 2011; Thorén *et al.*, 2018). Therefore, managing competing logics within a single or multiple institutional fields introduces complexity to the institutional analysis, with different responses (Fossestøl *et al.*, 2015). The difficulty is to recognise when a new institutional logic emerges to become dominant and how long that logic is sustained; thus, exploring the institutional logics is not limited to the identification process but also needs to contextualise by time and space (Scott, 2014, 2011). Reay and Hinings (2009) investigated two competing logics in the healthcare field in Canada from 1994 to 2008, and revealed that institutional logics co-exist and are sustained in a single organisational field. Their study also suggests that the competing institutional logics can be managed at the micro-level by a collaborative relationship between actors. Thus, institutional logics can co-exist and do not necessarily dominate the institutional environment when conflicting logics exist. However, Thorén *et al.* (2018) study of open digital practices in Sweden revealed that institutional logics achieve homogeneity in the environment, despite the prevalence of unresolved tensions. In a study of the Norwegian welfare system, Fossestøl *et al.* (2015) investigated how organisations respond to institutional complexity at the national level. They found that organisations respond to dominant and subordinate logics through three strategies: negative, positive or ad-hoc. The ad-hoc response strategy takes the form of indecisive adherence to the complex institutional environment and allows the organisation to deal with institutional complexity and conflicting logic over time without affecting the overall dominant logic. Burton-Jones *et al.* (2019) study of health information systems in Australia suggested the term *bootstrapping logic* as an outcome of the tension between logics; corporate logic prevails over professionalism logic during the adoption phase of an IS project.

The literature is inconclusive about whether the interplay of dominant and competing logics enables or constrains the early stage adoption of information systems in a complex

environment of OGD. Moreover, most of the literature addresses information system adoption from its social, cultural and process effects, not from the political effects as in the case of OGD adoption (Janssen *et al.*, 2012). Therefore, this research aims to explore the dominant and competing logics in the institutional environment and how they are perceived, interpreted and enacted. It also aims to understand the interactions of different logics, to shed light on the interplay of institutional logics in affecting the OGD initiative.

3.3.3 Principles of Institutional Logics

Institutional logics definitions suggest five core principles: *embedded agency*, *inter-institutional system*, the *material and cultural foundations* of institutions, institutions at *multiple levels* and *historical contingency*.

3.3.3.1 Embedded agency

The principle of embedded agency arose from the critique of institutional theory addressing agency, where institutional theorists focus on the organisational level and omit the agency level (Battilana, 2006). Neo-institutionalism theorists argued that organisations shape individuals' actions (Friedland and Alford, 1991); however, individual actions are also claimed to shape organisations (Battilana, 2006). The agency level looks at the cultural-structural dimension, where actors represent the agency as organisation, not as individuals (Abdelnour *et al.*, 2017). To be comprehensive, institutional analysis must address three levels: individuals, organisations and society. The *embedded agency* principle of institutional logics states that "interests, identities, values, and assumptions of individuals and organisations are embedded within prevailing institutional logics" (Thornton *et al.*, 2012), and the three levels are nested together.

The recent addition of *community* as another institutional order (Thornton *et al.*, 2012), put the emphasis on institutional logics not only at the macro-level but also at the micro-level. This corresponds to the criticism of agency embeddedness in institutional logic analysis by scholars following the *institutional work* strand. However, Thornton *et al.* (2012) acknowledged the importance of institutional work in the analysis as it enhances understanding in the field of macro-dynamics.

3.3.3.2 Society as an inter-institutional system

The concept of society as an inter-institutional system is drawn from the work of (Friedland and Alford, 1991), which considers individuals as part of the higher-level institutional orders

of *family, state, corporation, market, professions.* The institutional logics perspective added *religion* (Thornton, 2004) and *community* (Thornton *et al.*, 2012) resulting in the seven *institutional orders (archetypes)*. The institutional orders of the X-axis, as illustrated in Table 3.2, represent different cultural symbols and material practices presented in the institutions of different domains; the Y-axis institutional orders represent "a governance system that provides a frame of reference that preconditions actors' sensemaking choices" (Thornton *et al.*, 2012).

Table 3.2 Inter-institutional System Ideal Types – (Adopted from (Thornton et al., 2012))

Y-Axis	***X- Axis: Institutional Orders***						
Categories	**Family**	**Community**	**Religion**	**State**	**Market**	**Profession**	**Corporation**
Root Metaphor	Family as firm	Common boundary	Temple as bank	States as redistribution mechanism	Transaction	Profession as relational network	Corporation as hierarchy
Sources of Legitimacy	Unconditional Loyalty	Unity of will Belief in trust & reciprocity	Importance of faith & sacredness in economy & society	Democratic participation	Share price	Personal expertise	Market position of firm
Sources of Authority	Patriarchal domination	Commitment to community values & ideology	Priesthood charisma	Bureaucratic participation	Shareholder activism	Profession association	Board of director Top management
Sources of Identity	Family reputation	Emotional connection Ego-satisfaction & reputation	Association with deities	Social & economic class	Faceless	Association with quality craft Personal reputation	Bureaucratic roles
Basis Norms	Membership in household	Group membership	Membership in congregation	Citizenship in nation	Self-interest	Membership in guild & association	Employment in firm
Basis of Attention	Status in household	Personal investment in group	Relation to supernatural	Status of interest group	Status in market	Status in profession	Status in hierarchy
Basis of Strategy	Increase family honour	Increase status & honour of members & practices	Increase religious symbolism of natural events	Increase community good	Increase efficiency profit	Increase personal reputation	Increase size & diversification of firm
Informal Control Mechanism	Family politics	Visibility of actions	Worship of calling	Backroom politics	Industry analysis	Celebrity professionals	Organisation culture
Economic Systems	Family capitalism	Cooperative capitalism	Occidental capitalism	Welfare capitalism	Market capitalism	Personal capitalism	Managerial capitalism

The institutions are viewed as multiple levels of analysis where actors are nested and interact with different levels of individuals, organisations, fields and society. Applying institutional logics to the OGD initiative is a powerful lens through which to capture the logics in the institutional environment as a whole, at the micro-level, within the organisations' settings at the macro-level, and in the institutional environment level.

3.3.3.3 The material and cultural foundations of institutions

Institutional logics encompass material and cultural aspects that influence agency and organisational behaviours. Each order in the institutional environment incorporates cultural and material characteristics. Institutional logics addresses the cultural element to include the symbolic and normative components, which were not combined in institutional theory (Friedland and Alford, 1991; Thornton and Ocasio, 2008; Friedland, 2018).

3.3.3.4 Institutions at multiple levels

Institutions exist at multiple levels, which is a core principle of institutional logics, including macro- and micro-levels (Thornton *et al.*, 2012; Zilber, 2016; Durand and Thornton, 2018). Institutional analysis by the first wave of neo-institutionalist scholars focuses on the societal level (Friedland and Alford, 1991) and the industry level (Thornton, 2004); however, institutional logics suggest a meta-theory to consider the different levels (Thornton and Ocasio, 2008; Thornton *et al.*, 2012). Field-level logics link to societal logics: "We posit that field-level logics are both embedded in societal-level logics and subject to field-level processes that generate distinct forms of instantiation, variation, and combination of societal logics" (Thornton *et al.*, 2012, p. 148).

The OGD initiatives in developing countries are initiated by national government, involving multiple heterogeneous organisations and actors at a societal level. Therefore, studying phenomena associated with complexity requires institutional analysis at multiple levels to reveal the logics guiding organisations' and actors' practices.

3.3.3.5 Historical contingency

In institutional logics, the historical pattern is a primary element that interprets the practices of individuals and organisations to provide meaning to social reality. The historical aspect enables understanding of organisational behaviour in terms of power and control within the institutional environment (Thornton *et al.*, 2012). The organisational behaviours are embedded within the higher societal logics in institutions (Friedland and Alford, 1991).

Thus, this research investigates the interactions at the intra-organisational level in institutional environment to uncover why and how the OGD initiative is affected.

In order to understand the practices and behaviours in the institutional environment, it is essential to examine the historical events of the OGD initiative that constrain or enable it. The historical element can be revealed through practices, assumptions, values, beliefs, and rules within the institutional environment (Jackall, 1988; Friedland and Alford, 1991).

3.4 Other Institutional Perspectives and Concepts

Institutional logics perspectives embody structure, culture and process that entail other perspectives (Thornton *et al.*, 2012). Therefore, this research addresses these other perspectives related to institutional logics: *institutional change*, *institutional trust*, *institutional complexity* and *institutional work*. Expanding these institutional perspectives will shed light on how and why institutional logics cause the practices and behaviours in the institutional environment.

3.4.1 Institutional Change

Institutional change is "the abandonment of institutionalised practices, structures, and goals, and/or the adoption of institutionally contradictory practices, structures, and goals, by an individual organisation or field of organisations" (Kraatz and Moore, 2002, p. 120). Institutions react to change in different contexts in multiple forms and activities, reflecting social, political, organisational and technological dimensions (Weerakkody *et al.*, 2011; El-Haddadeh *et al.*, 2013).

Developing countries like Oman, which is the case study of this research had e-gov implementation that had reached maturity, a radical change was forced on many government organisations, involving transformation from the typical paper-based operations to the electronic form. The new practices evolved over time, entailing change in the beliefs and norms of how government organisations should provide services to the public (Scott, 2014, 2011). Institutional change implies abandoning current practices, structures and goals (Llamas-Sanchez *et al.*, 2013), although change can be either incremental or radical in introducing new beliefs and norms (Scott, 2014, 2011).

Institutional change is exercised at the micro-level, although the trigger occurs at the macro-level. Therefore, institutional change is a link between the macro- and micro-levels, and

alignment is a vital factor (Davidson and Chismar, 2007). The national initiative implies interaction between both levels, and because of overlapping issues it is essential to explore the present alignment between the micro-macro-level.

Institutional logics is a driver of change, and Thornton and Ocasio (2008) identified three mechanisms related to institutional change that can be applied in institutional analysis: *institutional entrepreneurs*, *structural overlap* and *even sequencing*. The later added competing logics to address the required change.

The emphasis in institutional theory is on rationale myths, isomorphism and institutional logic. Logic is needed to understand the influences of an institution's cognitive behaviour that drives the institutional change (Dacin *et al.*, 2002; Scott, 2011). Institutional change embraces new institutional logics (Hayes *et al.*, 2014); however, the change can only be incremental rather than radical, especially in the public sector.

Understanding the issues and challenges of the OGD initiative at the macro- and micro-levels is one objective of this research, intended to reveal the cognitive map of institutional logics (Scott, 2014, 2011). Institutional logics embed the end and practical relationships of the actors within the institutional environment (Currie and Guah, 2007; Bromley and Powell, 2012). (Palthe, 2014) suggests that behavioural reasoning drives and sustains organisational change, as illustrated in Table 3.3, in terms of the institutional context of regulative, normative and cognitive dimensions as associated respectively with *have to change, ought to change,* and *want to change.*

Table 3.3 Regulative, Normative, and Cognitive Elements Associated with Organizational Change - (Adapted from (Palthe, 2014))

	Regulative	***Normative***	***Cognitive***
Legitimacy	Legal systems	Moral and ethical systems	Cultural systems
Central Rudiments	Policies and rules	Work roles, habits and norms	Values, beliefs and assumptions
System Change Drivers	Legal obligation	Moral obligation	Change values are internalized
System Change Sustainers	Fear and coercion	Duty and responsibility	Social identity and personal desire
Behavioral Reasoning	Have to	Ought to	Want to

3.4.2 Institutional trust

Institutional trust affects the relationship between organisations, and the trust that occurs between inter-organisational entities is called institutional-based trust, which "refers to the

phenomenon that individuals or collective actors develop trust in the face of specific institutional arrangements in the business environment" (Bachmann and Inkpen, 2011).

Several scholars have studied trust in organisations from the micro-level perspective, where the trust is established at the individual level through face-face interactions; however, few studies have focused on the trust-building processes which occur at the inter-organisational level (Ratnasingam, 2005). Bachmann and Inkpen (2011) argue that the interaction-based trust, which occurs at the micro-level, is not sufficient to build a trusting relationship between organisations. However, once organisations have established a trust relationship, micro-level trust disappears and has no input in the decision-making process.

According to Bachmann and Inkpen (2011), four mechanisms enable trust-building processes at the inter-organisational level: *legal regulation*, *reputation*, *certification* and *community norms, structures and procedures*. These mechanisms are associated with specific targets, as shown in Table 3.4. In the process of building trust in an inter-organisational relationship, Bachmann and Inkpen (2011) recognise that *situations* can be categorised into four. In the early stages, *swift trust* involves transactions with a low level of assets specificity and in matures industries. This mechanism represents *how*, whereas the *situation* factor represents *when* institutions consider building a trust relationship with other institutions. Institutional trust in OGD initiatives is an essential factor that may impede adoption, particularly at an early stage. The inter-organisational trust-building process is essential in establishing a strong relationship between organisations, advancing or hindering the adoption of new ideas in the information technology field.

Table 3.4 Mechanism and their Primary Targets (Bachmann and Inkpen ,2011)

Mechanism	**Primary Target**
Legal Regulation	Antecedents relationship
Reputation	Practices of interaction
Certification	Antecedents relationship
Community norms, structures and procedures	Practices of interaction

The third-party guarantor plays a vital role in establishing trust between organisations. In this research case study, the regulator's role as guarantor is essential in building trust with the government organisations. The regulator's role as guarantor has already been established in another e-initiative and the earlier perceptions and experience of stakeholders about this

will enable/hinder the progress of the overall initiative. The organisation's reputation also affects the legitimacy of the regulatory authority (Deephouse and Suchman, 2008).

3.4.3 Institutional Complexity

Organisations face complexity when the institutional environment incorporates multiple competing logics that constrain the dominant institutional logic (Greenwood *et al.*, 2011; Voronov *et al.*, 2013). The institutional environment of the OGD initiative consists of heterogeneous government organisations (Greenwood *et al.*, 2014); this heterogeneity facilitates different competing logics in the institutional environment, resulting in complexity (Reay and Hinings, 2009; Thornton *et al.*, 2012) and encouraging disagreement (Hensmans, 2003). According to Yang *et al.* (2015) empirical study of Taiwanese open data, as shown in Figure 3.1, complexity arises from four perspectives: technological, organisational, legislative and policy, and environmental.

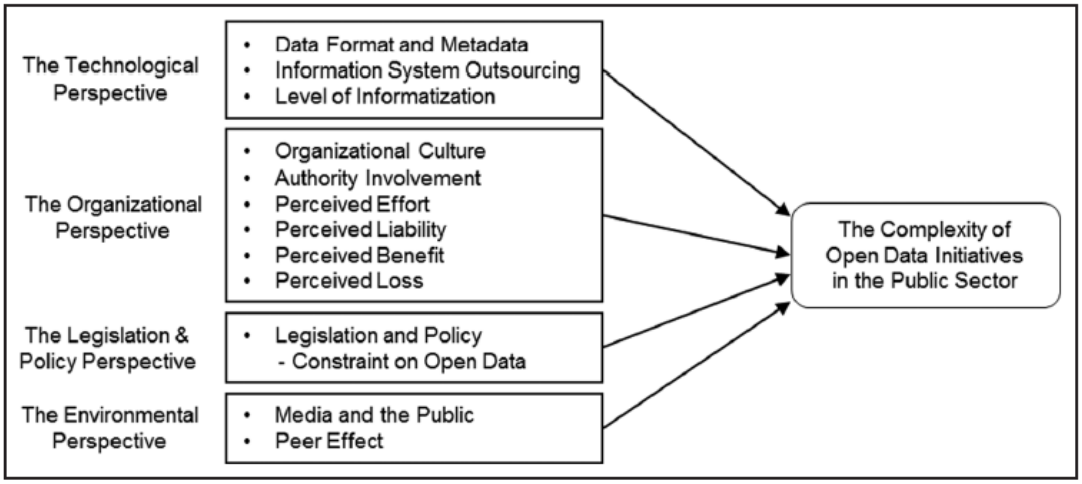

Figure 3.1 Open Data Complexity (Yang *et al.*, 2015)

OGD adoption at the national level involves many stakeholders from multiple organisations that require inter-organisational interaction to translate institutional logics into practice. Moreover, the OGD initiative is dependent on several independent information systems and projects that contribute to the complexity of the initiative (Levitt and Scott, 2017). In a similar context of large-scale IT implementation, the study by Currie and Guah (2007) of healthcare system implementation in the UK revealed that the IT implementation was impeded by non-linear institutional logic. This finding contradicts the linear process models of Tolbert and Zucker (1999) which move serially from one stage to another.

3.4.4 Institutional Work

The concept of institutional work was introduced by Lawrence and Suddaby (2006), defined as "the purposive action of individuals and organisations aimed at creating, maintaining and disrupting institutions" (Lawrence and Suddaby, 2006,215). It addressed the gap in neo-institutional theory (Di Maggio and Powell, 1991) which ignores agency and actors. From the definition of institutional work, it is clear that, unlike neo-institutional theory, there is an embedded agency represented by actors and actions, which affects the institutions directly. Figure 3.2 shows the recursive relationship between institutions and action (Lawrence *et al.*, 2009). Institutional work moves the attention from the institutional level to the human action that creates, maintains and transforms the institution (Gawer and Phillips, 2013).

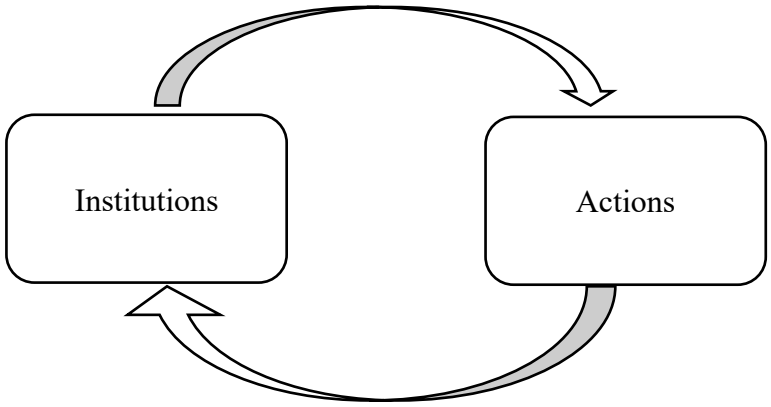

Figure 3.2 Recursive Relationship (Lawrence *et al.*, 2009)

Institutional work analysis argues that there are three sequences of action: creating, maintaining, and disrupting institutions. However, creation implies the notion of a new action which is not always the case. Gawer and Phillips (2013) study of the Intel corporation as a single case study argues that institutional work pressures the logic for institutional change. This suggests a model of institutional work as a logic shift, both *externally* (external practice work and legitimacy) and *internally* (internal practice work and identity work); see Figure 3.3. Therefore, institutional work allows us to investigate the actors' role in complex national initiatives and to advance the knowledge of how the interplay between institutional logics and institutional work occurs in complex environments of multiple organisations.

The complex environment encompasses several government organisations at the national level, where the regulators consider as the *principals* and other government organisations as *agents*. Contextualising the setting of OGD initiative at the national level, the *principals* are

present by the IT and data regulator, where *agents* are different government organisations (Gawer and Phillips, 2013). The institutional complexity entails issues and problems in the relationship between the principals and agents to ensure the adoption of OGD. Therefore, in order to understand the institutional complexity of OGD, the institutional analysis needs to address people, processes, and policies in the institutional environment (Luna *et al.*, 2014).

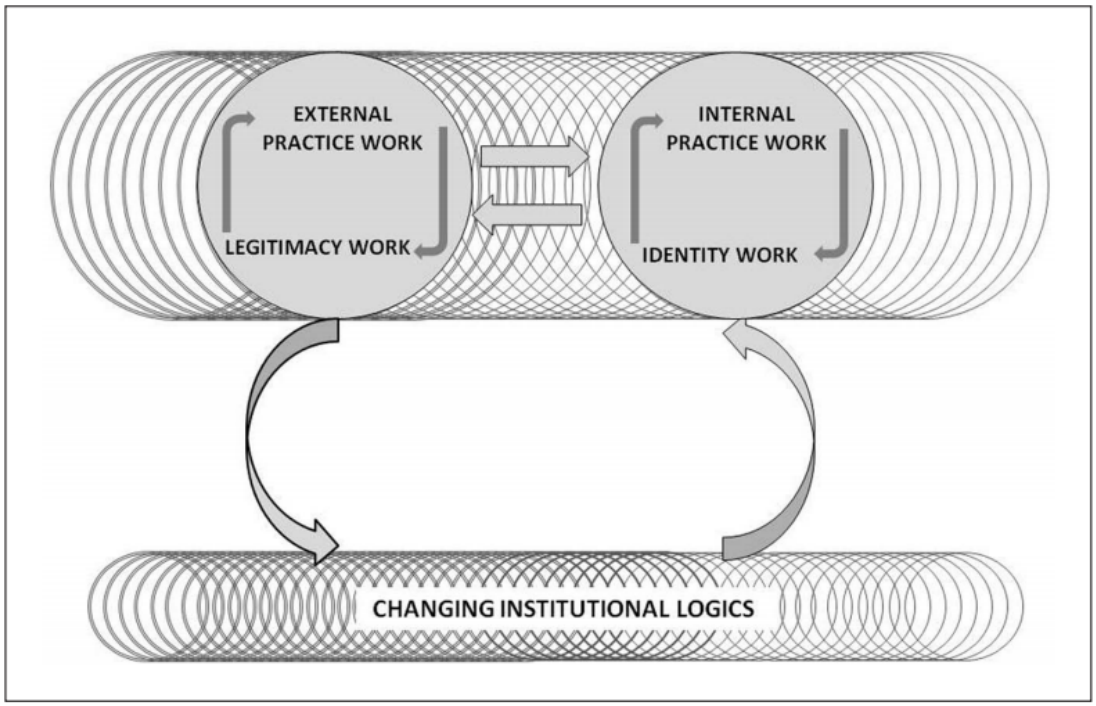

Figure 3.3 Model of institutional work as logics shift (Gawer and Phillips, 2013)

3.5 Other theories and OGD

The OGD initiative involves several stakeholders with different opinion, culture and behaviours, therefore the researcher considers other theories used in the information systems discipline to investigate the suitability for this research.

3.5.1 Stakeholder theory

The stakeholder theory stems from the business ethics that considers values and principles of stakeholder from the strategic management perspective (Freeman and McVea, 2001; Freeman, 2010; Freeman, 1984). The stakeholder's approach were introduced by the seminal work of Freeman who defined the stakeholder as " Any group who can affect or is affected by the achievement of the organisation's objectives" (Freeman, 1984, p. 46). Freeman (2010) categorised the stakeholder groups in the modern firm as depicted in

Figure 3.4, and acknowledge that stakeholder is not limited to the identified group but also can be categorized into smaller categories from the main group.

The stakeholder theory addresses moral and values in managing an organisation (Freeman, 1984), therefore the unit level of analysis is at the firm or organisation level. The stakeholder theory as a lens addressing the OGD adoption is useful to understand the motivations of different stakeholders. From the OGD context, Gonzalez-Zapata and Heeks (2015) investigated Chile's OGD implementation through the lens of stakeholder theory to explore the motivations of different stakeholders. The latter categorize stakeholder in OGD implementation from a power and interest perspective into primary groups and secondary groups. The stakeholder theory is relevant within this research to understand different stakeholder motivations. This research applies the institutional logics from the institutional perspectives that encompass multiple organisations. Thus, the institutional logic provides an in-depth insight and links the stakeholder level to the institutional environment level and addresses how the logics sustain and shift in the institutional environment.

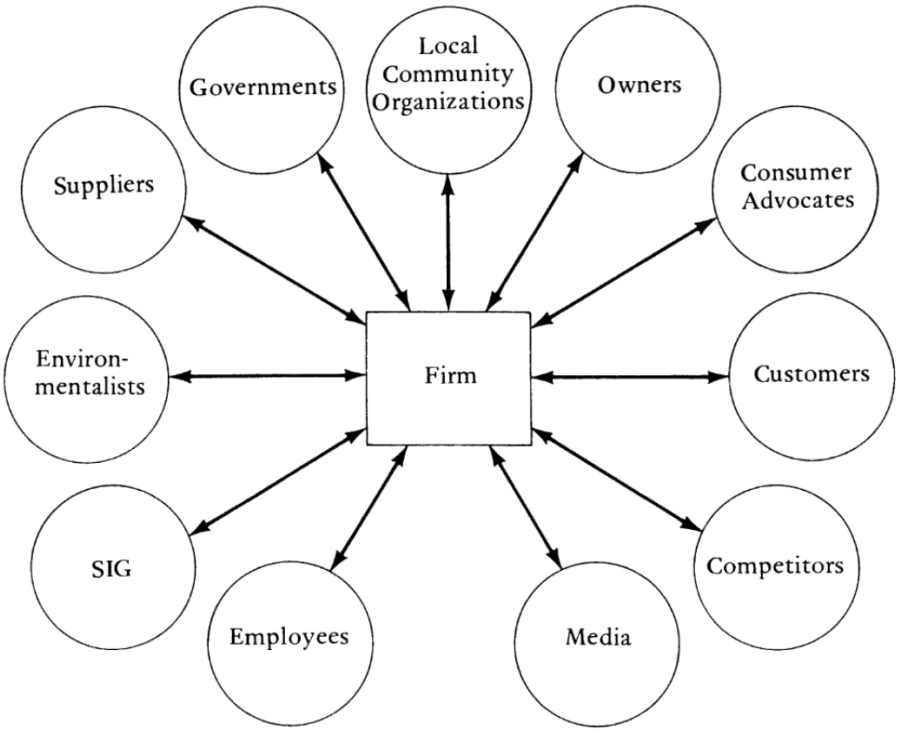

Figure 3.4 Stakeholder view in the firm (adapted from (Freeman, 2010))

3.5.2 Culture theory

The research shows that culture is an important factor that affects IS adoption in particular the organisational culture. However, studying the organisational culture is "difficult to study,

partly because it is not an easy concept to define" (Davison and Martinsons, 2003, p.3). Schein (2010) definition of culture is one of the most cited definitions that defines culture as:

> A pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems.
>
> (Schein, 2010, p.17)

The organisational culture is constitutive in the institutional environment that stemmed from the national culture (Schein, 2010). The Schein (2010) culture model shows that the culture developed from three levels i.e Artefacts, Espoused values and Underlying assumptions. The artefacts level stems from the organisational structure and processes where the actors start to observe and inquire. The espoused level focuses on strategies, goals, and philosophies where inconsistencies emerge between the artefact and espoused values in the organisation. The third level presents the underlying assumption that shape the granted belief, perceptions, and thoughts in the organisation culture.

The IS literature show that culture affects the adoption at the organisational and national level (Leidner and Kayworth, 2006; Carter and Weerakkody, 2008; Zhao and Fan, 2018; Choudrie *et al.*, 2017). Similarly, the OGD discipline revealed that the organisational culture affects OGD adoption from local and national level perspectives (Altayar, 2018; Zhao and Fan, 2018; Styrin *et al.*, 2017; Janssen *et al.*, 2012).

Cultural differences at the national level stem from the dissimilarities of members of the human group and how they perceive the logic. Thus, there are cultural differences between developing and developed countries (Hofstede, 1984), that stipulate this research to address the cultural aspect of the OGD initiative. The literature shows that unlike developed countries, the culture in developing countries is less transparent and tends to be closed which impede the adoption of OGD (Chen *et al.*, 2006; Ho and Im, 2015; Van Alstyne *et al.*, 1995).

Culture theory is a useful lens to understand the OGD phenomena, however, the Institutional logics perspectives embody the cultural aspect to interpret the ideation and meaning of

different logics in the institutional environment (Thornton *et al.*, 2012). Moreover, there is a link between culture and institutional logics through the belief systems, meaning and cultural materials (Hinings, 2012; Scott, 2014). Thus, the culture theory is not within the scope of this research where the institutional logics and institutional pillars are useful tools to understand the OGD adoption from the cultural perspectives.

3.6 Institutional Logics and Information Systems Research

Several scholars have used institutional theory as a lens through which to interpret institutions' behaviours in the field of information technology (Teo *et al.*, 2003; Bunduchi *et al.*, 2008; Srivastava *et al.*, 2009; Jensen *et al.*, 2009; Baptista, 2009; Lyytinen *et al.*, 2009; Rajão *et al.*, 2009; Al-Fraih and Al-Qarioti, 2010; Currie and Finnegan, 2011). Accordingly, information technology enjoys significant gains from studying institutions and vice versa, where organisations gain value from translating the impact of technological change into practices and behaviours (Orlikowski and Barley, 2001).

Information technology scholars who have used institutional theory are categorised into three streams. The first stream, which represents the majority, apply institutional theory to understand the *institutional effects* of information systems (Teo *et al.*, 2003; Phang *et al.*, 2008; Standing *et al.*, 2009). These effects are related to processes that affect other organisations. The second stream studies the institutionalisation process (Hu *et al.*, 2007; Wang and Burton Swanson, 2008), and the third applies the theory to interpret the interaction between IT and institutions (Hu *et al.*, 2007; Mignerat and Rivard, 2009).

Institutional theory is powerful lens in exploring institutional behaviour, however scholars criticised the institutional theory and argued that it lacks the agency embeddedness in the institution's structure (Cardinale, 2018; Lok and Willmott, 2019; Jensen *et al.*, 2009) . Thus, scholars used other theories to supplement institutional theory. For example, Jensen *et al.* (2009) used the theory of organizational sensemaking by Weick (1995) to supplement institutional theory from the practice and human agency perspectives at the micro-level. However, institutional logics adequately address and incorporate agency factors in institutional analysis (Thornton *et al.*, 2012).

Currie and Finnegan (2011) conducted an empirical investigation into the UK healthcare information system using the Tolbert and Zucker (1999) model, and they concluded that the model confirmed their findings; however, they argued that the *de-institutionalisation* stage is an important process in addressing political and ideological arguments prior to the

habitualization process. Thus, it can be argued that this model is not fixed but vary according to the case and the time and stage applied. Similar to the OGD initiative in Oman in terms of size, Huigang *et al.* (2007) theoretical model was used to investigate the adoption of information systems in organisations using institutional theory. Their model explains how top management mediates the impact of external pressures. Their survey revealed that institutional pressures have a significant role not only in information systems but also for the artefacts within organisations.

3.6.1 The gap in Information System Literature

Several scholars have applied institutional theory to information systems in the context of the public sector (Haughton, 2006; Currie and Guah, 2007; El-Haddadeh *et al.*, 2013; Bunduchi *et al.*, 2019). The empirical study of Haughton (2006) revealed that the effects of information system adoption at the *pre-implementation* stage are not always tangible. This stage was therefore considered as an *adoption* stage (Swanson and Ramiller, 2004). Thus, the effects of system adoption in OGD at this early stage might not be visible to all the stakeholders, who demand additional work.

In general , research in information systems tends to study the organisational environment, whereas only few studies have been conducted at the inter-organisational level (Currie, 2009; Bunduchi *et al.*, 2019). In this context, King *et al.* (1994) argued that institutions are fluid entities in the form of an inter-organisational network, rather than being stable and inflexible. Thus, evaluating institutions and institutional environments and their behaviour is essential as the OGD initiative encompasses heterogeneous environments, involving different stakeholders at the different macro- and micro-levels. Moreover, the context of developing countries is a different domain with specific characteristics that has limited research by institutionalists in the domain of OGD.

Institutional theory is an investigative tool for analysing information systems from the perspective of social culture (Orlikowski, 2000). Although adding another lens has been shown to extend the analysis of institutional behaviours and practices to another dimension (Weerakkody *et al.*, 2009), the multi-level analysis introduced by institutional logics has narrowed the gap. Institutional analysis from an ecosystem perspective provides in-depth analysis of the phenomena investigated (González-Zapata and Heeks, 2017), therefore ,along with institutional logics, this research applies the institutional pillars (Scott, 2014) to gain a holistic understanding of the OGD phenomena.

The institutional logics perspective by Thornton *et al.* (2012) has attracted researchers in various fields. A double volume series named *Institutional Logics in Action* addresses several aspects of institutional logics by several scholars and focuses on three areas: the *meta-theoretical foundations* of logics, *institutional logic processes*, and *institutional complexity and organisational responses* (Lounsbury and Boxenbaum, 2013). However, the information systems domain is not yet anchored, and only a few studies have investigated it (Currie and Guah, 2007; Sahay *et al.*, 2010; Asangansi, 2012; Sandeep and Ravishankar, 2014; Hayes *et al.*, 2014; Bunduchi *et al.*, 2019; Berente *et al.*, 2019). Various studies have addressed different information systems that encompass the institutional complexity of institutional logics (Berente *et al.*, 2019; Burton-Jones *et al.*, 2019; Bunduchi *et al.*, 2019). However, there is a gap in the literature on applying the institutional logics perspective within information systems at complex national-level initiatives (González-Zapata and Heeks, 2017); it should shed light on how logics shape and reconcile the institutional environment.

Identification of the institutional logics is complex as the initiative embraces multiple stakeholders who require multiple levels of analysis and an understanding of various interactions and cultural dimensions (Leidner and Kayworth, 2006). This research bridges this gap and contributes to the body of knowledge in the context of OGD initiatives in developing countries, that have not been addressed in the literature using institutional logics. Moreover, the *pattern inducing* technique facilitates theory development and is in line with the objective of this research to develop a conceptual framework from the case study (Reay and Jones, 2016). Capturing the logics in a qualitative study is a tedious process, so the study contributes by explaining how to apply the pattern inducing technique in a large and complex environment.

3.7 Open Government Data Conceptual Framework

This section presents the conceptual framework for this research. The conceptual framework is a vital element in interpretive research to understand and explain the phenomena under study, and can be constructed in either a graphical or a narrative form. It is must address *why?* and *how?* questions (Walsham, 1995; Miles *et al.*, 2014). The development of the conceptual framework is based on the structured-case methodology (Carroll and Swatman, 2000); it is the "researcher's *representation* of the conceptual structure brought to the research process" (Carroll and Swatman, 2000, p. 237).

This conceptual framework is developed to uncover and understand institutional factors that affect the adoption of OGD in the context of Oman as a developing country. Its purpose is to highlight the associated factors that affect the adoption of OGD. In order to develop a conceptual framework a theoretical foundation is essential, and therefore; in this research it is based on the institutional theory and institutional logics perspectives (Eisenhardt, 1989; Carroll and Swatman, 2000). Developing the conceptual framework includes constructs from the data collected in the pilot study, and further constructs and ideas are added in an iterative process (Ravitch and Riggan, 2016). Thus, the final revised conceptual framework incorporates the final data collected and the analysis of findings.

The conceptual framework developed for this study, adapted from Carroll and Swatman's (2000) seminal work, is illustrated in Figure 3.5. First, the conceptual framework components are derived from the literature review and the theoretical constructs, and their sources clarify the process of development. The initial conceptual framework was based on the first iteration of the data collected from the institutional environment of the OGD initiative in Oman. After that, the conceptual framework applied in the field through the process of plan, data collection, data analysis and reflections. The reflections are incorporated into the conceptual framework, where a similar process applied to develop an updated conceptual framework. In this iterative process, the conceptual framework is revisited at every development cycle to incorporate a new understanding of the research themes till the researcher reaches a saturation point where no further themes emerged (Carroll and Swatman, 2000; Miles *et al.*, 2014). This research developed the conceptual framework in the iterative cycle to conclude with the initial conceptual framework depicted in Figure 3.7

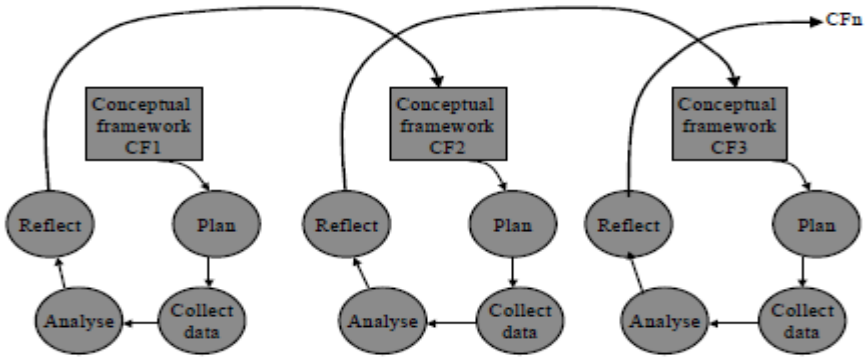

Figure 3.5 Framework Development Cycle (Adapted from Carroll & Swatman, 2000)

3.7.1 The Conceptualisation of Institutional Pillars

The conceptual framework first incorporates the three institutional pillars that affect institutions through related mechanisms: *regulative*, *normative* and *cultural-cognitive* (Scott, 2014, 2011). They affect the defined institution, which in the case study is the *Omani government*. The institutional environment encompasses macro- and micro-levels, the former being the national level represented by the regulatory authorities, and the latter the government organisations. Every government organisation is a subsystem of the broader social system. Figure. 3.6 indicates how the three institutional pillars affect the institutional environment of the OGD initiative.

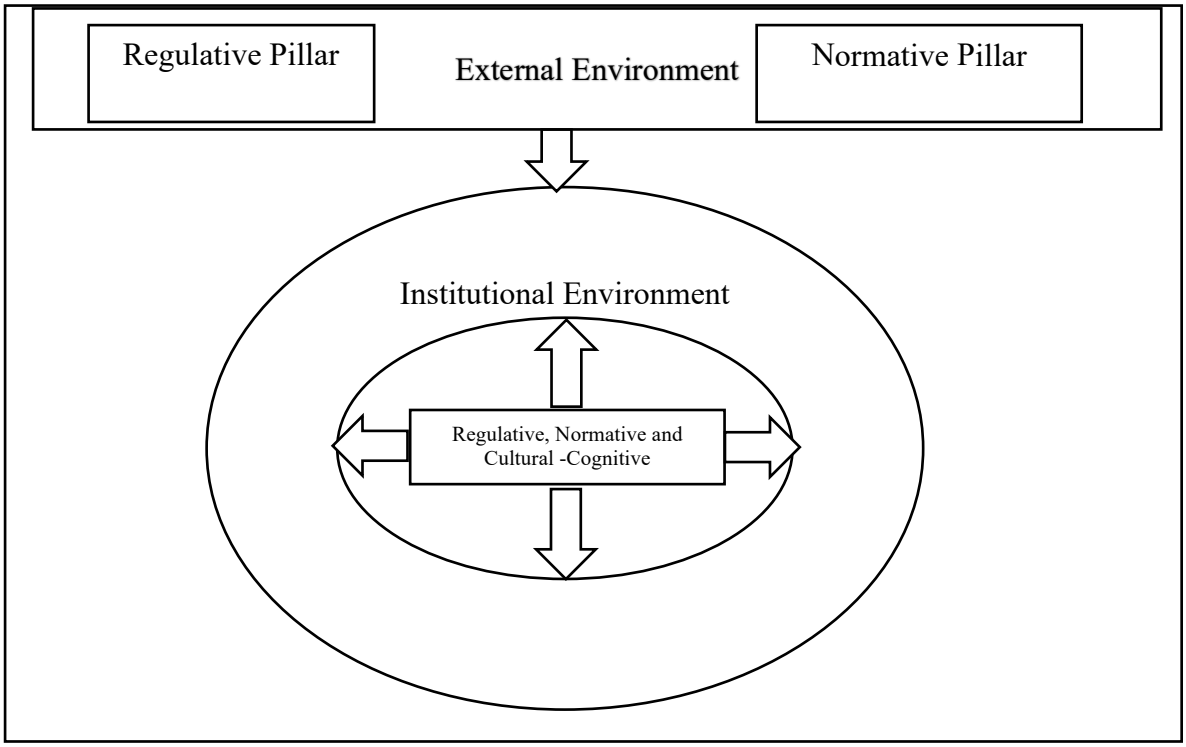

Figure 3.6 Institutional Pillars – (Adapted from (Scott, 2014, 2011))

The institution's legitimacy is obtained by the legal sanctions; thus, the regulative pillar is associated with rules, incentives and sanctioning activities that use a coercive mechanism to ensure proper behaviours of the institution. Legitimacy is considered as an ultimate outcome of resolved tensions in the institutional environment (Greenwood *et al.*, 2011; Lounsbury and Boxenbaum, 2013; Pache and Santos, 2013), although it can be sustained in the institutional environment of OGD despite existing unresolved tensions (Thorén *et al.*, 2018).

Scott (2011) added the cultural-cognitive aspect because, for an organisation to survive, it has to conform to norms and belief systems. There is a link between culture and institutional

logics through the belief systems, meaning and cultural materials (Hinings, 2012). The institutional pillars are not present in isolation and can co-exist in a complex institutional environment (Scott, 2011; Klecun *et al.*, 2019). In a revised edition, Scott (2014) stressed that institutional pillars are often combined in robust institutions, although they may change over time. For example, the regulative pillar can evolve into normative and cultural-cognitive systems. Moreover, institutional pillars present different weights in the institutional environment, whose effects are not equal (Frumkin and Galaskiewicz, 2004; Alzadjali and Elbanna, 2019).

The normative and regulative pillars, as illustrated in Figure 3.6, influence and pressure the institutional environment externally. However, all three also internally exert pressure on the institutional environment. Thus, the conceptual model suggests that the internal regulative and normative pillars operate at the macro-level and are presented by the regulators' power and profession in the institutional environment. However, coercive pressure can arise from external forces outside the institutional environment. All the institutional pillars are considered as a basis for legitimacy (DiMaggio and Powell, 1991; Scott, 2011). Table 3.5 illustrates the institutional pillars with their mechanisms and indicators.

Table 3.5 Three Pillars of Institutions, (adapted from ((Scott, 2014))

	Regulative	Normative	Cultural-Cognitive
Basis Of Compliance	Expedience	Social obligation	TAKEN-FOR-GRANTEDNESS, SHARED UNDERSTANDING
Mechanism	Coercive	Normative	MIMETIC
Indicators	RULES, LAWS, SANCTIONS	CERTIFICATION, ACCREDITATION	COMMON BELIEFS, SHARED LOGICS OF ACTION ISOMORPHISM

3.7.1.1 Regulative Pillar

The regulative pillar affects an organisation by coercive means (DiMaggio and Powell, 1991; Scott, 2011), represented by rules, regulations, monitoring and sanctioning activities. From the conceptual framework, this research argue that regulatory authority from the case study forces institutions and actors to follow the rules and laws set, which not only affects the organisation but also permeates through the entire institutional environment.

While enforcement is carried out in the form of coercive power by the regulatory authority to make the government organisations conform to the regulations, the institutions comply with these norms and belief systems through either sanctions or incentives. (Scott, 2014, p. 62) asserted that "institutions supported by one pillar may, as time passes and circumstances change, be sustained by different pillars", that is the normative and cultural-cognitive pillars. Although it is not essential for all the institutional pillars to be present within the institutional environment, the cultural-cognitive and normative pillars are a conglomerate of soft-power influence and are the weapons of choice in contemporary organisations (Scott, 2005).

From the institutional logics perspective, institutions set laws and rules to promote their interests, and individuals and institutions conform to avoid sanctions or attain reward (Thornton *et al.*, 2012). This establishes a social-psychological link between norms and rules within institutional logics and behaviours in the societal environment (Thornton *et al.*, 2012). In this case study, regulatory authorities are those exercising power over the IT-related rules and laws, as well as the data-related regulations. However, coercive pressure might also be present from external entities, such as the regulations set by international organisations.

The coercive mechanisms of the regulative pillar that influence institutional practices at the macro- and micro-levels are supplemented by reward systems which affect the institutional behaviour at both levels (Scott, 2011; Thornton *et al.*, 2012).

3.7.1.2 Normative Pillar

The normative pillar largely relies on professionalisation. Normative pressure is defined as the "collective struggle of members of an occupation to define the conditions and methods of their work, to control the production of the producers and to establish a cognitive base and legitimation for their occupational autonomy" (DiMaggio and Powell, 1991, p. 70). Normative systems embrace both *values* and *norms*, the former representing individuals' compliance with existing structures or behaviours, and the latter explaining how things should be done (Scott, 2014, 2011). Therefore, the normative pillar affects both organisational structure and process. Professional knowledge is the main driver by which individuals or the organisation exercise normative pressure over others (Berger and Luckmann, 1967). Thus, the association of one department with another organisation either within or outside the institutional environment imposes normative pressure on the entire environment.

The conceptual framework confirms that normative pillar could affect the institutional environment, in addition to the behaviour of individuals. The pressures are derived from organisations that are accredited in their professional field, such as the IT and data regulatory authorities (DiMaggio and Powell, 1991; Llamas-Sanchez *et al.*, 2013). However, they might arise from peer-comparison with either external organisations in a different societal system or with an organisation in the same societal system.

3.7.1.3 Cultural-Cognitive Pillar

The third pillar of the institution is cultural-cognitive, where the basis of compliance is by taken-for-granted and shared understanding in the societal system (Scott, 2014). The cultural-cognitive pillar is "the shared conceptions that constitute the nature of social reality and the frames through which meaning is made" (Scott, 2014, p. 57). This embodies the cognition element, which is usually implicit and dependent on the actors' understanding to make sense of behaviours and practices and is usually taken for granted (Scott, 2014). Thus, the cognitive element in the institutional environment of OGD is produced by the cognitive structures and symbolic systems shared by the macro- and micro-level stakeholders.

Cultural-cognitive implies embeddedness in the institutions which is challenging to recognise and reconcile (Leidner and Kayworth, 2006). The cultural-cognitive pillar provides *cognitive frames*, *templates*, or a *set of collective meanings*, by which the organisation achieves legitimacy when it mimics the structure or actions of other organisations (Scott, 2014, 2011). The mechanism applied is thus mimicry to gain legitimacy and to survive in the institutional environment (DiMaggio and Powell, 1991; Scott, 2011); it is employed by organisations when conditions of uncertainty prevail in the institutional environment (DiMaggio and Powell, 1991; Scott, 2014). Unlike the normative pillar, which refers to the collective sense, the cultural-cognitive pillar refers to actors' assumptions and beliefs. In a literature review conducted by Leidner and Kayworth (2006) of case studies that address the cultural dimension in information systems adoption, the most frequently selected approach used by the adopter was uncertainty avoidance.

In the conceptual framework, the cultural-cognitive pillar is a significant factor in the institutional environment of OGD. It stems from the actors' cultural aspect, which is embedded in the entire environment. The conceptual framework suggests that the cultural-cognitive pillar influences OGD adoption internally, although the element is absent as a mechanism from the external environment.

3.7.2 The Conceptualisation of Institutional Logics Perspectives

As illustrated in the earlier sections, the emphasis in institutional logics is on the *effects* of different logics that shape the rationale of individual and organisational behaviours. Figure 3.7 presents the conceptual framework for the OGD initiative, showing how and why the ideations of different logics shape the meaning of the institutional practices in the institutional environment. In the conceptual framework, the institutional logics operate at multiple levels and link the micro- and macro-levels (Thornton and Ocasio, 2008).

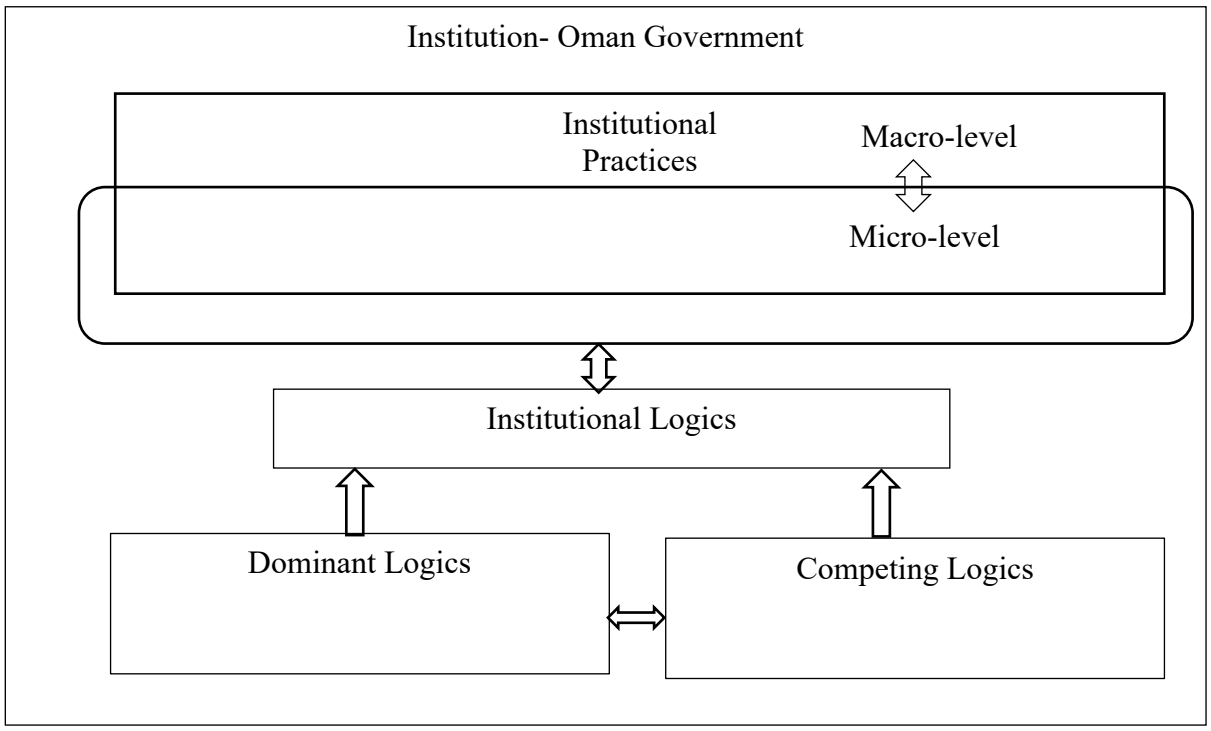

Figure 3.7 Conceptual Framework for Open Government Data Initiative

Addressing institutional change means understanding the organisational models, institutional logics and governance structure (Scott, 2005). Therefore, Figure 3.8 illustrates the effect triggered by different institutional pillars and institutional logics perspectives. The interaction and interplay illustrated in the figure suggest that institutional pillars influence the institutional logics by institutional change through regulative, normative and cultural-cognitive mechanisms. The institutional practices in the environment are shaped by the institutional pillars and institutional logics, and vice versa. Moreover, the institution is susceptible to change in different institutional pillars and different institutional logics

through space and time and at macro- and micro-levels. The impact on the institution is reflected in the overall national OGD initiative.

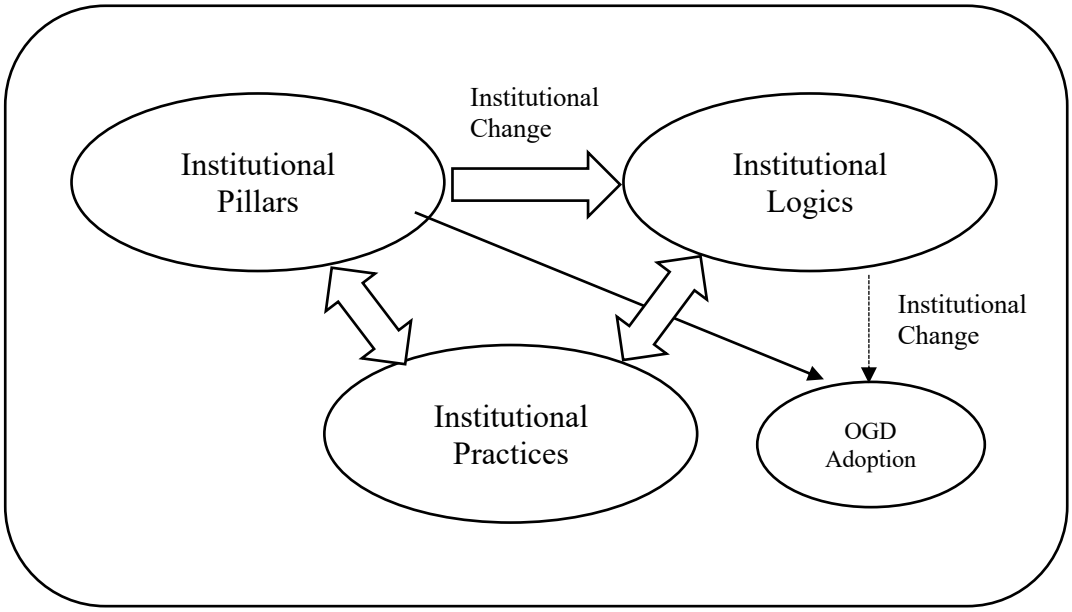

Figure 3.8 Interactions between the Institutional Logics and other Institutional perspectives

3.8 Summary

This chapter sheds light on the micro foundation of institutional theory from its inception from different social, economic and political disciplines (Berger and Luckmann, 1967; Meyer and Rowan, 1977; Di Maggio and Powell, 1991). It illustrates the advance of neo-institutionalism in the institutional analysis of DiMaggio and Powell (1991), and the introduction of organisational isomorphisms, coercive, mimetic and normative, that explain why a particular change occurs with the objective of legitimacy. Furthermore, Scott (2011) pillars of institutions are illustrated, with the addition of the culture-cognitive pillar that links the macro-level and micro-level in the institution.

Following different definitions of institutions (Scott, 2011; Martin, 2004), the research uses Martin (2004) definition, specifically here as the Omani government embedded with the different organisations such as regulators and government organisations, that represent the level of analysis.

Furthermore, the chapter discusses the institutional logics as a theoretical lens to investigate the OGD initiatives in developing countries, contextualising it to the Oman case study. Institutional logic responds to the criticism of agency embeddedness in neo-institutionalism and facilitate a meta-theory that offers an in-depth analysis from different perspectives at all

levels (Thornton and Ocasio, 2008). Unlike neo-institutionalism, which focuses on isomorphism and societal systems, institutional logics emphasises the effects of different logics that shape the rationale of individuals and organisations. Institutional logics is a more appropriate theoretical lens to investigate the OGD initiative at the national level, as logic differs from one organisational type to another. Moreover, the literature shows that institutional logics has not been studied and explored empirically in the context of the OGD initiative. The chapter also reviews the five principles of institutional logics: embedded agency, inter-institutional systems, the material and cultural foundations of institutions, institutions at multiple levels and historical contingency.

Other institutional perspectives, such as institutional pillars, institutional change, institutional trust and institutional complexity, are explored to shed light on how and why institutional logics influence practices and behaviours in the institutional environment of OGD. The literature suggests a scarce of studies that have investigated institutional logics in the OGD (González-Zapata and Heeks, 2017). A further gap exists in applying and capturing the institutional logics at the complex national level (Currie and Guah, 2007; Sahay *et al.*, 2010; Asangansi, 2012; Sandeep and Ravishankar, 2014; Hayes *et al.*, 2014; Reay and Jones, 2016; Bunduchi *et al.*, 2019).

Chapter 4 : Research Methodology

4.1 Introduction

Research is "seeking through methodical processes to add to one's own body of knowledge and, hopefully, to that of others, by the discovery of non-trivial facts and insights" (Howard and Sharp, 2002, p.6). In order to conduct scientific research, an appropriate methodology is an important aspect of interpreting reality, assumptions and beliefs (Myers and Newman, 2007).

This chapter outlines the research paradigm and methodology used here to study the phenomenon of the OGD initiative, considering the case of Oman[1] as a developing country. It explains how the research conducted and discusses the methods employed from the initial stage of the research design to the final stage of data analysis and interpretation.

The first sections of the chapter describe different philosophical assumptions, research paradigms, research approaches and strategies and then explain the rationale for selecting the methodology for this research. A qualitative interpretive paradigm is adopted, employing a case study strategy which suits the research context.

The last two sections explain how the data collection is conducted, and the analysis methods and techniques applied. The chapter concludes with the measures, tactics and rigour applied to ensure the reliability and validity of the results. Figure 4.1 illustrates the selected research methodology.

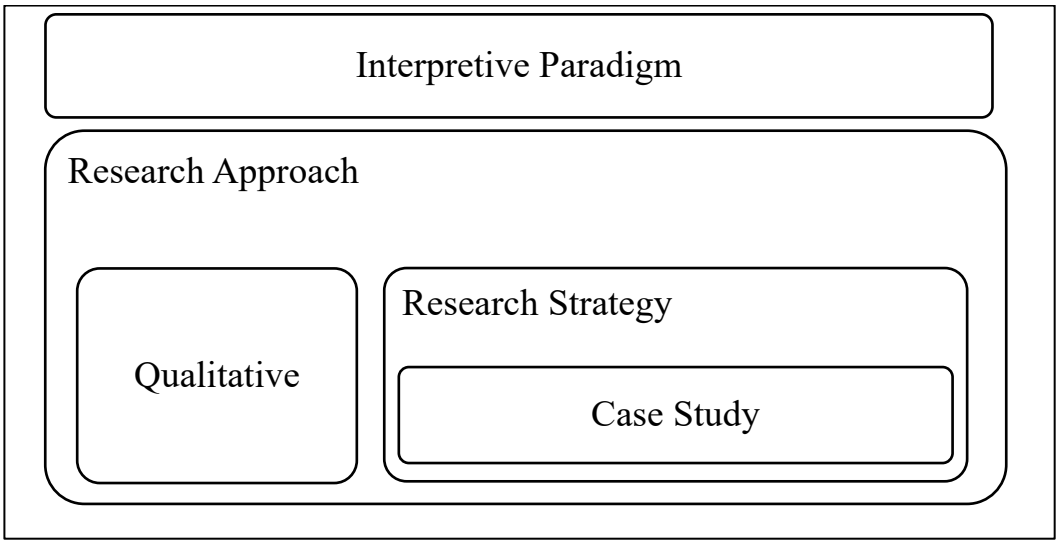

Figure 4.1 Research Methodology Applied

[1] See Appendix A - Institutional Context of the Case Study (Oman)

4.2 Research Paradigm

The research paradigm guides the researcher in choosing the appropriate methodology that fits the reality of nature. Reality comprises ontology and epistemology, which interprets the knowledge about that reality (Myers, 2019). Ontology addresses the nature of reality, and epistemology is a philosophy concerned with the nature, sources and limits of acceptable knowledge. Thirdly, methodology concerns how the researcher interprets the finding of social reality (Orlikowski and Baroudi, 1991; Mingers, 2003). According to Guba and Lincoln (1994), there are four categories of research: positivist, interpretive, critical and post-positivist. Different research paradigms in Information Systems can be used to address the research questions, based on philosophical assumptions. Orlikowski and Baroudi (1991) categorised the qualitative research paradigm in information systems research into three categories, positivist, interpretive and critical, and this research uses their classification as it fits the IS domain. The basic beliefs of ontology, epistemology and methodology of research paradigm in IS are illustrated in Table 4.1 (Al-Salti, 2011; Hevner and Chatterjee, 2010).

Table 4.1 Research Paradigm in Information Systems (Hevner and Chatterjee, 2010; Al-Salti, 2011)

Basic Beliefs	**Research Paradigms**		
	Positivist	**Interpretive**	**Critical**
Ontology (What is the nature of reality?)	A single objective reality exists	Multiple realities, socially constructed	Multiple, contextually situated realities
Epistemology (Is what is learned independent of the researcher?)	What can be learned about the social world existing independently of the researcher	What is learned in research does not exist independently of the researcher	The researcher is not independent of what is researched
Methodology (How should the researcher go about finding out about social reality?)	Survey questionnaire Simulation Experiment	Action Research Case Study	Case study Grounded theory Ethnography

4.2.1 Positivist Paradigm

Bryman (2016, p. 714) defined positivism as "An epistemological position that advocates the application of the methods of the natural sciences to the study of social reality and beyond". The positivist paradigm ontology assumes an objective world in which a single reality exists; and value-free inquiries where the researcher is independent and natural. Positivist researchers seek to uncover the truth about reality using quantifiable measures of variables to understand the phenomena investigated. Moreover, the positivist researcher seeks to draw general assumptions of reality by testing different theories (Chen and Hirschheim, 2004; Oates, 2005). However, the positivist considers individual behaviours as passive in uncovering reality, which prevents revealing people's beliefs in social settings (Bryman, 2016).

Research into OGD, as an information system, has been dominated by the positivist paradigm, with limited interpretive approach (Orlikowski and Baroudi, 1991; González-Zapata and Heeks, 2017). Positivism regards IS as a separate element from the people and organisations that influence individual behaviours (Orlikowski and Baroudi, 1991). Given this research context, using institutional logics to identify meaning and ideation that influence behaviour, the positivist paradigm does not satisfy the research design.

4.2.2 Critical Paradigm

The critical paradigm critiques the current situation to investigate what is wrong instead of what is right in the real world; it focuses "on issues such as asymmetries of power, alienation, disadvantaged groups or structural inequity issues" (Walsham, 2005, p.113). The paradigm aims not merely to understand what is happening but to bring change to the subject investigated, immersing itself with the investigated subject to free them from a problem. However, critical researchers focus on criticism rather than empowering the subject investigated. The critical paradigm is an ideology rather than a method, and it often uses interpretivism in interpreting the data. Thus the researcher is not value-free from the subject (Willis *et al.*, 2007).

The critical stance in IS research is very limited and rarely applied, although it has attracted more interest recently (Myers and Klein, 2011). The paradigm comprises three elements, insight, critique and transformative redefinition, and applies a set of principles (Myers and Klein, 2011).

The philosophy of critical realism in social science is based on the seminal work of Roy Bhaskar in late seventies. The critical realism attracted IS scholars in applying the critical

realism in IS case study research (Mingers *et al.*, 2013; Bhaskar, 2013; Wynn and Williams, 2012; Williams and Wynn, 2018). The critical realism focuses on the real problems and causes that present a shift from the data focus method. The critical realism differentiates between the transitive and intransitive knowledge and argue the intransitive knowledge don't rely on human action. The critical realism focuses on as "Causal forces (i.e. mechanisms) that would have to exist in order to explain a given phenomenon." (Williams and Wynn, 2018, p. 318).

The research aim is not to bring change to the phenomena studied, where the aim of this research is to investigate how the institutional pillars and institutional logics influence the institutional practices in OGD. Thus, the critical paradigm is not the best fit for this research. Moreover, the institutional complexity of OGD requires a deep understanding of different views at organisational and individual levels. Thus, the research adopts the inductive approach but does not use a critical theory.

4.2.3 Interpretive Paradigm

Bryman (2016, p. 712) defined interpretivism as "An epistemological position that requires the social scientist to grasp the subjective meaning of social action". Interpretive philosophy is situated around the reality concept that suggests the phenomena cannot be understood independently of social actors (Orlikowski and Baroudi, 1991). The views of participants in the investigated subject generally guide the researcher to interpret the phenomenon (Creswell and Creswell, 2018).

In contrast to positivism, dependent or independent variables in interpretive research are not essential. The researchers in IS research are attracted to the interpretivist paradigm as it captures people's beliefs and behaviours and provides an in-depth understanding of the social reality (Walsham, 2006). Interpretive research in the information system domain encourages understanding of social actions and how people make sense of a situation. The aim of the interpretive method is to understand the context of the IS and the processes that affect it and are influenced by it (Klein and Myers, 1999; Oates, 2005). Therefore, this research adopts the interpretative paradigm to uncover in-depth opinions and views of the participants and organisations.

4.2.4 The rationale for selecting interpretivism

Following the discussion of different research paradigms, this researcher adopts interpretivism as the best fit for the study. The aim of the research is to investigate how institutional logics affect the emergence and adoption of the OGD initiative in the public sector, contextualised in a case study in Oman. According to the ontological assumptions of interpretivism, knowledge is available through the actors' views which can be sensed through their social contribution (Eriksson and Kovalainen, 2015). The phenomena investigated in this research require social actors to reveal the institutional practices, allowing the researcher to explore the meanings of participants from different government organisations in the OGD initiative (Orlikowski and Baroudi, 1991). It is not required to define independent and dependent variables or to prove a hypothesis (Oates, 2005). Moreover, the phenomena studied include social and organisational aspects where interpretivism offers greater richness than positivism (Orlikowski and Baroudi, 1991). Thus, from the above discussion, the interpretive paradigm is considered the most appropriate for this study.

4.3 Research Approach

A research approach is either qualitative or quantitative, each addressing the reality of the subject in different ways. Sarantakos (2012) highlights these differences, which are illustrated in Table 4.2. A mixed-method approach presents a third option which combines the quantitative and qualitative approaches, which is beyond the objective of this study.

Table 4.2 Main differences between Quantitative and Qualitative research approaches (Sarantakos, 2012)

Feature	Quantitative methodology	Qualitative methodology
Nature of reality	Objective; simple; single; tangible sense impressions	Subjective; problematic; holistic; a social construct
Causes and effects	Nomological thinking; cause–effect linkages	Non-deterministic; mutual shaping; no cause–effect linkages
The role of values	Value neutral; value-free inquiry	Normativism; value-bound inquiry
Natural and social sciences	Deductive; model of natural sciences; nomothetic; based on strict rules	Inductive; rejection of the natural sciences model; ideographic; no strict rules; interpretations
Methods	Quantitative, mathematical; extensive use of statistics	Qualitative, with less emphasis on statistics; verbal and qualitative analysis
Researcher's role	Passive; distant from the subject: dualism	Active; equal; both parties' are interactive and inseparable
Generalizations	Inductive generalizations nomothetic statements	Analytic or conceptual general-izations; time-and-context specific

4.3.1 Quantitative Methodology

From the philosophical view, the quantitative approach is considered as a positivism paradigm (Creswell and Creswell, 2018). It is an inductive method that supports the natural sciences, seeking answers to the phenomena investigated through numerical and statistical facts (Sarantakos, 2012). The aim of the quantitative research method is to establish cause and effect between variables by applying mathematical and statistical analysis to answer *what?*, *when?*, and *where?* research questions. The role of the researcher is independent and passive. The quantitative approach is either experimental or by survey, and the research design often focuses on structured interviews and questionnaires to collect data (Creswell and Creswell, 2018).

4.3.2 Qualitative Methodology

Qualitative research encompasses narrative, phenomenology, grounded theory, ethnography, and case study research strategies (Creswell and Creswell, 2018). It seeks answers to the phenomena investigated through the holistic view of social settings. Unlike the quantitative method, qualitative research uses inductive reasoning and is based on interpretive epistemology (Bryman, 2016; Creswell and Creswell, 2018). The aim is to uncover and observe participants' experiences and find meaning in their behaviours. The qualitative research design includes different sources of data such as unstructured interviews, observation, documents, and audio-visual materials (Creswell and Creswell, 2018). This research adopts the qualitative methodology due to the rationale explained in the next section.

4.3.3 The rationale for selecting the Qualitative Methodology

Following the selection of the interpretivist paradigm, this research applies the qualitative research method, for several reasons. First, as the research deals with the public sector at the national level with a complex social context, the qualitative approach allows the researcher to study OGD phenomena to uncover the knowledge, opinions and experiences that influence the adoption. Secondly, the OGD initiative comprises different government organisations with diverse decisions, processes and culture. Therefore, it requires in-depth analysis to understand the logic of social actors' behaviours in making sense of reality. Moreover, the research setting of this thesis entails organisational and social aspects, which makes interpretivism a more appropriate method. Thus, the interpretive approach enables this research to gain an in-depth understanding of the phenomena. The positivist approach is

rational when testing the hypothesis variables or formal propositions, but none of this applies to this research.

The interpretive epistemology therefore guides this research with the use of a single embedded case study research design (Yin, 2014). The primary data is collected from the case study semi-structured interviews, where interpretation is the best method of analysing the interview material (Walsham, 1993).

4.4 Research Strategy

Various research strategies are used in conducting qualitative research, including narrative, phenomenology, grounded theory, ethnography, and case study (Creswell and Creswell (2018).

Narrative research is a humanities research strategy that aims to interpret reality from people's stories about their lives. It combines the participants' view with the research view in a collaborative narrative setting. The phenomenology research strategy stems from philosophy and psychology, seeking reality from the experience of people who inhabit the phenomena. Thus, phenomenology involves conducting interviews (Creswell and Creswell, 2018).

Grounded theory comes from the sociology strand where the objective is to generate theory from the grounded data (Myers, 2019). Ethnography stems from anthropology and sociology (Creswell and Creswell, 2018), and the researcher focuses on the shared patterns of behaviours, language and actions of a culture. The strategy requires extensive time in the institutional environment, as data is collected from observation and the actions of participants (Myers, 2019).

The case study research strategy can be applied in any field and allows the researcher to make an in-depth analysis over a set period of time. Myers (2019) suggested that the most appropriate strategy for IS empirical research is the case study. This research therefore adopts the case study research design under the qualitative research method and interpretivist paradigm. The next section discusses in detail the case study research strategy and the rationale for its selection.

4.4.1 Case Study Research Strategy

The use of a case study in social science is a powerful research strategy (Benbasat *et al.*, 1987; Cassell and Symon, 2004; Yin, 2014). Benbasat *et al.* (1987) identified eleven characteristics of the case study method, defining it study as follows:

> A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organizations). The boundaries of the phenomenon are not clearly evident at the outset of the research and no experimental control or manipulation is used.
>
> (Benbasat *et al.*, 1987, p. 371).

Yin (2014) suggests that the case study method is widely recognized for social studies when contextualising the conditions to the study of phenomena. It is: "An empirical inquiry that investigates a contemporary phenomenon (the 'case') in depth and within its real-world context, especially when the boundaries between phenomenon and context may be clearly evident" (Yin, 2014, p. 16).

Yin's definition has four elements: the context is relevant; there are many variables of interest; there is a need for multiple sources of evidence (triangulation); and there is prior development of theory. He argues that case studies are not limited to quantitative evidence but can be a mix of quantitative and qualitative evidence and can be conducted with many different motives from individual cases.

Designing the research is another important aspect in using the case study strategy. Yin (2014) defined the research design as a "Logical plan for getting from here to there, where here may be defined as the initial set of questions to be answered, and there is some set of conclusions (answers) about these questions" (Yin, 2014, p. 28).According to Yin (2014), there are five components in the research design of the case study:

1. The study's questions.
2. Its propositions, if any.
3. Its unit(s) of analysis.
4. The logic for linking the data to the propositions.
5. The criteria for interpreting the findings.

Case study strategy has many advantages, including its use with any philosophical approach (Yin, 2014). The method can combine several qualitative data tools such as interviews, documentation, observation, questionnaires and time series (Dubé and Paré, 2003). Moreover, case study strategy has the advantage of answering the question *why*? and *how*? and is often used in explanatory and exploratory research (Cassell and Symon, 2004; Yin, 2014). Case studies are heterogeneous in nature, as the research design can be a single or

multiple cases, with diverse levels of analysis from individuals and groups to organisations and the wider institutional environment (Cassell and Symon, 2004). Yin (2014) classified the case study research design in to two types as illustrated in Figure 4.2. It can be either holistic or embedded, the latter involving more than one subunit of analysis; and it can be either a single-case or multiple-case design.

The use of case studies has attracted many scholars in the information systems domain, because of a shift from a technological to an organisational perspective (Walsham, 1995). Additionally, rapid advances in information technology mean the emergence of new topics requiring in-depth study and analysis, which can be achieved robustly through the case study strategy (Benbasat *et al.*, 1987).

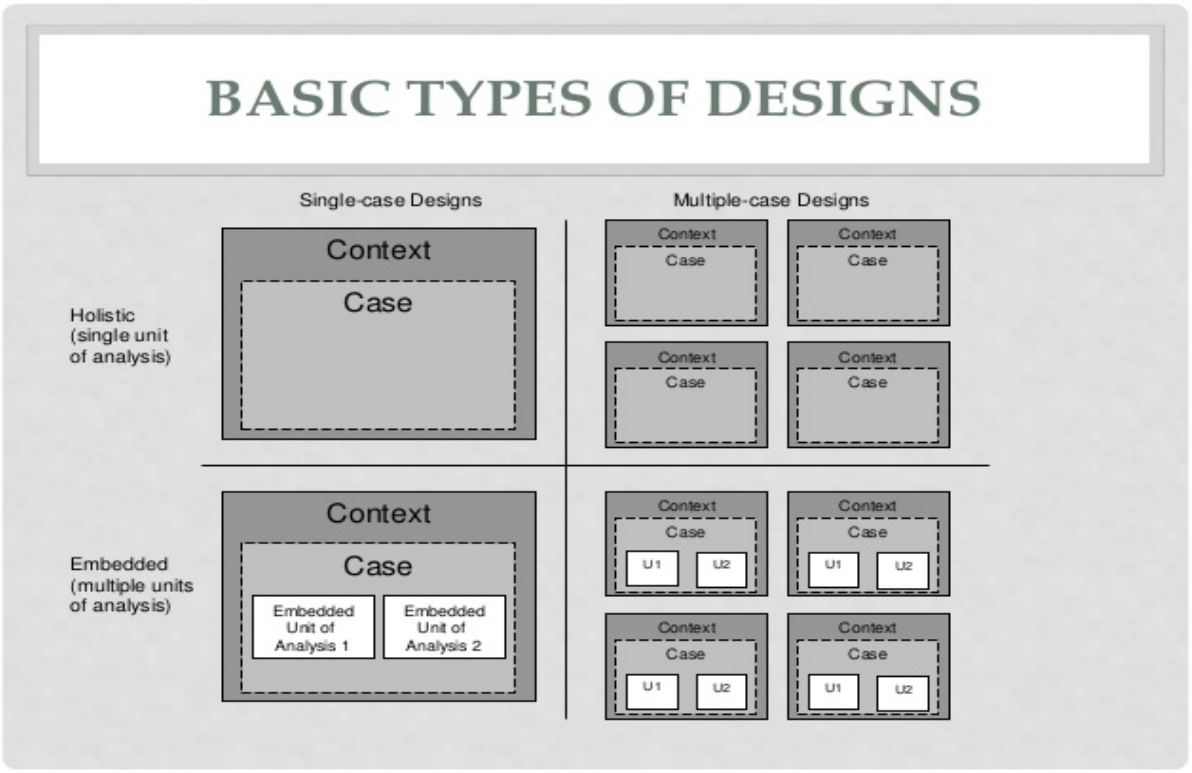

Figure 4.2 Basic Types of Case Study Design. (Yin, 2014)

Addressing the OGD initiative requires in-depth research within one ecosystem from the organisational perspective. The case study design of the OGD initiative in Oman illustrated in Figure 4.3 is a single embedded case study. The context level is the national level of OGD in Oman, with the embedded subunits of analysis comprising seven government organisations at the micro-level and two regulators at the macro-level.

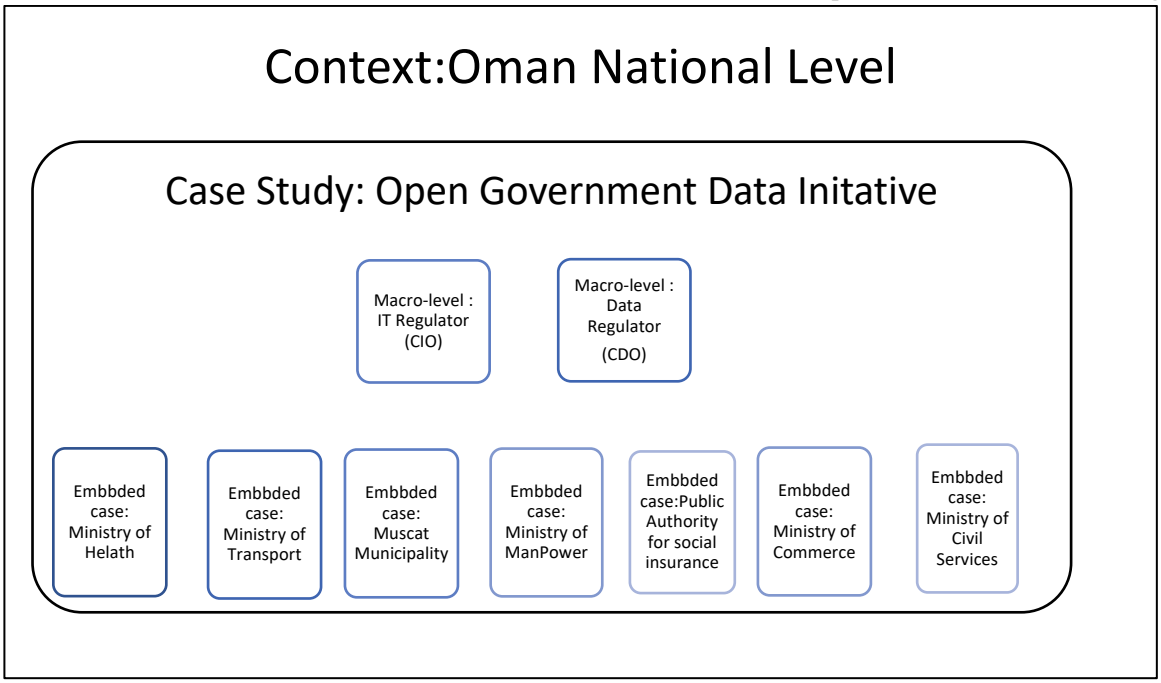

Figure 4.3 Case Study Research Design – Adapted from Yin (2014)

4.4.2 The rationale for the Case Study selection and design

In order to achieve the aims and objectives of the research, and based on the interpretive research paradigm, this study uses a qualitative approach to investigate how the institutional pillars and institutional logics affect the adoption of (OGD), contextualising it to the case of Oman. This research is primarily contextualised to developed countries where limited studies address the context of developing countries, therefore Oman is selected as a developing countries case (Wen and Hwang, 2019; Talukder *et al.*, 2019). Moreover, the case of Oman OGD is not achieving the desired objectives, therefore the phenomena present an accessible case for this research to explore. Additionally, the current literature shows no research of OGD in the Omani context.

The target of the study is government organisations in the public sector at the macro- and micro-levels. The case study has an embedded single-case design (Yin, 2014) where the context is at the national level, with embedded units of analysis which are government organisations. This enables the analysis of multiple sources of evidence from nine government organisations involved in the OGD initiative.

The single embedded case study is selected as this research define *Oman's government* as an institution embedding different organisations that represent the unit level of analysis. The multiple-case study involves multiple level of analysis, which does not suit this research design as the phenomena context level is the national level of OGD in Oman. Moreover,

addressing the organisational issues, the case study is considered the most appropriate research approach for IS adoption, allowing the researcher to be part of the context being investigated (Choudrie and Dwivedi, 2005).

Analysis is at the national level as the OGD initiative is to serve Oman's government. This includes all the government organisations as users of the services provided by the OGD project. There is some criticism of the single-case embedded design, as the researcher may focus on subunits and not return to the top unit of analysis (Yin, 2014), but because of the links between the various levels in Oman in a multi-organisational analysis, the design is appropriate here.

4.4.3 Case Study Protocol

The case study protocol is a procedural guideline for collecting data, increasing the reliability of the research at all stages (Yin, 2014). It ensures uniformity in gathering data from multiple organisations (Eisenhardt, 1989), as outlined in the author's framework. The Eisenhardt framework, as illustrated in Table 4.3, is recognised as one of the best designs to suit information systems research (Pervan and Maimbo, 2005), and is essential in handling the different organisations at both micro- and macro-levels. The outlines of the case study protocol are as stated in the Appendices[2].

Table 4.3 Framework for Case Study Research - (Adapted from (Eisenhardt, 1989))

Step	Activity
1. Getting started	Definition of research question
	Possibly a priori constructs
2. Selecting cases	Neither theory nor hypotheses
	Specified population
	Theoretical, not random, sampling
3. Crafting instruments and protocols	Multiple data collection methods
	Qualitative and quantitative data combined
	Multiple investigators
4. Entering the field	Overlap data collection and analysis, including field notes
	Flexible and opportunistic data collection methods
5. Analysing data	Within-case analysis
	Cross-case pattern search using divergent techniques
6. Shaping hypotheses	Iterative tabulation of evidence for each construct
	Replication, not sampling, logic across cases.
	Search evidence for "why" behind relationships
7. Enfolding literature	Comparison with conflicting literature
	Comparison with similar literature
8. Reaching closure	Theoretical saturation when possible

[2] See Case Study protocol in Appendix B

4.5 Data Collection

The data is collected at both the macro-level (the national level that includes the regulator organisations and responsible authorities) and the micro-level (seven government organisations) in Oman. The selected organisations have participated in the OGD project with different levels of engagement, reflecting the diverse opinions and experiences with the initiative.

The primary data is collected from interviews and focus group, and the secondary data from various sources including websites, official publications, organisations' document, policies, newspapers, journals, and stakeholder discussion in professional social media groups. Following Eisenhardt (1989), the number of organisations included continued until saturation point was reached, where no further organisation added to the case study. The researcher reached the saturation point as the information gathered became redundant from the organisation interviewed. The data collection took place in Oman from 18 July 2016 to 2 December 2016.

4.5.1 Pilot Study

The pilot study was to gain insight into the problem from the key actors in the institutional environment. The initial interview questions were framed based on the literature review and broader theoretical concepts of institutional theory perspectives (Scott, 2014; DiMaggio and Powell, 1991; Thornton *et al.*, 2012), to address the research question and sub-questions[3]. Ten interviews were conducted at this stage, and several documents and fields observations were collected to design the initial conceptual framework. The pilot study also allows the researcher to structure the interviews and questions more appropriately for the main data collection.

4.5.2 Semi-Structured Interviews

According to Yin (2014), six sources of evidence are commonly used in case study research: documentation, archival records, interviews, direct observation, participant-observation and physical artefacts. The interview is an important tool in collecting data in a case study research design, and face to face semi-structured interviews were selected to focus on the topic and provide insightful explanation (Yin, 2014). This method allows the researcher to explore the respondents' in-depth opinions and beliefs about the OGD initiative in Oman.

[3] See Appendix C - Pilot study interview questions

The aim of interpretive research is to allow participants to express their views and opinion; thus, open-ended questions are the most appropriate. Semi-structured interviews are preferred here over unstructured ones (Bryman, 2016; Walsham, 1995), ensuring the related topics are evolve flawlessly and are explored by participants (Punch, 2013). The semi-structured approach allows the respondents to elaborate on the topics more freely, giving the researcher an in-depth understanding of the issues related to the OGD adoption. The structure and themes of the questions vary according to the responsibilities of the interviewees at each level, and the questions[4] are framed to suit the regulators at the macro-level and subunit government organisations at the micro-level.

Following the pilot study, the researcher interviewed 30 respondents from senior and middle management and employee levels in seven government organisations, as illustrated in Table 4.4. Number of respondents were reached after a data saturation observed by the researcher where information emerged are redundant (Saunders and Townsend, 2016). Purposive sampling was used to select participants in this qualitative case study research(Ritchie *et al.*, 2014). Snowballing techniques were added, to identify further key participants on the recommendation of the original interviewees (Sarantakos, 2012). This combined strategy allowed the researcher to cover a wide spectrum of key participants in OGD initiative from different organisations.

The interviews were conducted in English at the organisations' premises and lasted between 45 and 120 minutes. They were recorded with the participants' consent[5]; however, two participants declined to be recorded and the researcher took notes to their opinions. In order not to lose the depth of understanding, the interviews were transcribed immediately, and the interviewees were later contacted to verify the accuracy of the transcript.

With regards to the saturation point, the researcher stopped adding further participants when no further knowledge about the OGD adoption was added, with the same information being repeated by the participants. Access to the information collected was confidential, and anonymity was assured by coding the participants to protect their identity.

[4] See Appendix D - Interviewees Questions
[5] See Appendix E - Consent Form Sample

Table 4.4 Interviewee participants from Macro and Micro-levels

Government Organisations	Top Management (CEO, CIO)	Managerial Level	Employee @ department level	Total
Macro-level (Regulators)				
Information Technology Authority (ITA)	1	3	1	5
National Center for Statistics and Information (NCSI)	1	2	1	4
Micro-level				
Ministry of Civil Service (MOCS)	1	1	0	2
Public Authority for Social Insurance (PASI)	1	1	0	2
Ministry of Transport (MOT)	1	0	0	1
Ministry of Health (MOH)	1	2	0	3
Ministry of Manpower (MOMP)	2	2	2	6
Ministry of Commerce and Industry	1	1	0	2
Muscat Municipality	2	2	1	5
Total	11	14	5	30

4.5.3 Focus Group

The interview agenda included not only individual interviews but also focus groups with participants from various organisations and levels. In the focus groups the researcher managed the discussion to observe the interactions between participants from different organisations, which is difficult to explore on an individual basis. This approach also addresses Yin (2014) criticism of case study design, that the researcher may concentrate unduly on the lower levels of analysis. Two focus groups were therefore conducted, with participants from different organisations at the macro- and micro-levels, to explore insights from different sources, with different opinions and beliefs.

4.5.4 Secondary Data

Secondary data supplements the evidence collected from the primary sources (Yin, 2014), and included organisations' reports, documents, website information, newspaper articles, and rules and regulations of the OGD in Oman. According to Creswell and Creswell (2018), digital material from social media like Facebook, WhatsApp and Twitter are important tools to capture participants' views and opinions, so the researcher gained further insights into the OGD initiative in Oman from the discussions of stakeholders and professionals in WhatsApp groups.

4.6 Data Analysis

Qualitative data analysis is a systematic process which aims to find meaningful explanations (Creswell and Creswell, 2018). It starts concurrently with data collection and depends on the researcher's skills to formulate themes from the data (Oates, 2005). The inductive content analysis method is one of the data analysis techniques in qualitative research (Miles *et al.*, 2014), undertaken in several phases: data reduction, data display, drawing conclusions and verification. Inductive contents analysis was used to extract meaning from the interview transcriptions, and latent meanings were derived to explore the institutional pillars.

The initial step in analysis was therefore to transcribe every interview from voice into the text. The transcriptions allowed the researcher to immerse himself in the data, providing a holistic view of different views and opinions. However, the transcriptions were time-consuming as the contributions from non-native English speakers required some interpretation of phrases to report accurate data (Walsham, 1995).

4.6.1 Pattern Inducing Technique

There are three techniques to capture the institutional logics: *pattern inducing, pattern deducing* and *pattern matching* (Reay and Jones, 2016). Pattern deducing is to capture logics by counting occurrences and co-occurrences, whereas pattern matching is an appropriate tool for "ideal type" comparison. Pattern inducing is the most appropriate technique for the inductive methodology, which suits this research Reay and Jones (2016) add that it facilitates theory development, which is also consistent with the objective of this research. Table 4.5 describes the three techniques. Pattern inducing technique uses inductive reasoning from bottom-up to frame the logic based on the beliefs and behaviours; it requires immerse involvement in the data from the researcher (Reay and Jones, 2016).

After gathering the data from the different sources, the next step in pattern inducing technique is to capture the beliefs that shape behaviours and actions by analysing and grouping them in a coded form. The grouped texts reflect the institutional practices which are guided by a particular symbolic or material logic (Friedland and Alford, 1991; Reay and Jones, 2016). The institutional logics emerge through an iterative and creative interpretation of the data as the categories develop through interactions and immersion during analysis. The institutional logic can be derived from this second cycle (Smets *et al.*, 2012).

Table 4.5 How to capture Institutional Logics Qualitatively- (Adapted from (Reay and Jones, 2016))

	Pattern deducing	Pattern matching	Pattern inducing
Description	Gather large volume of data (primarily text), convert text to countable occurrences, and use analytic methods to reveal patterns. Privileges analytic techniques	Identify patterns (ideal type of logics) from extant literature and then compare data to ideal type. Privileges existing theory and research	Focus on raw data using bottom-up process to identify patterns (logics) that can then be compared with extant literature. Privileges researcher
Ontology	Social world is constructed and historically embedded. These constructions empirically exist and create consequences, which can be pointed to and counted	Social world is constructed and understanding occurs with iteration between prior theories and empirical with current findings	Social world is constructed and language brings facts into consciousness. It plays a constitutive role
Epistemology	Semiotic structuralist	Analytic empiricist	Interpretivist
Research approach	Deductive and interpretation. Use analytic techniques to identify patterns and interpret patterns given deep knowledge of context	Comparison of deductive/theory driven and data	Inductive; grounded theory. Persuade through language (metaphor, analogy) and develop understanding to reveal patterns
How to assess meaning	Examine patterns that create semantic and referential meaning, including frequencies and co-occurrences of words and practices	Examine data associated with each predetermined category (pattern) to reveal meaning in comparison with ideal type	Examine and categorize text segments to reveal pattern based on underlying meaning
Unit of analysis	Words/phrases/images/objects and their relations	Field/societal sector	Text segments/quotes or excerpts
Methodology	Content analysis, observation	Any methodological technique	Ethnography; grounded theory
Software tools	NVivo, Atlas.ti, MAXQDA, WordCruncher Network packages such as UCINET, Pajek	Any qualitative software according to method chosen	NVivo, Atlas.ti, word processing (e.g. MS Word)
Challenges	Focus on breadth may reduce depth Overwhelmed by managing large data volume Fluctuating patterns may obscure insights	Need established context to identify typical (ideal type) May restrict new insights by starting from established theory	Generalizability due to restricted context Difficulty comparing across studies Difficulty in persuading reviewers that selection of quotes and examples is representative
Benefits	Captures historical changes and patterns over time Enables data reduction, representation, and visualization of patterns Facilitates analyzing larger volume of data Findings seen as more generalizable	Captures essential categories for comparison Facilitates consistent analysis across logics Facilitates comparison to other studies	Captures nuances of localized practices Data presentation retains rich context Captures actors' explanations of values and beliefs Facilitates theory development

To contextualise the identification process, the researcher followed the three-tiered approach of Gioia *et al.* (2013) as a guiding template to analyse the data inductively. The Gioia template provides rigour to the analysis, systematically transforming the raw data into structured data that has latent meaning.

Following the Gioia template[6], analysis of the interview data is carried out in two cycles. The first cycle commences with coding the transcribed text inductively by freely assigning narrative text to codes. This is a process of organising related chunks of transcribed text and representing them by a code or sub-code (Creswell and Creswell, 2018). Following this initial

[6] See Appendix E - for a sample Gioia template

coding stage, the codes are revised throughout the analysis process to remove irrelevant and redundant categories.

The second cycle is to identify the patterns and themes that constitute shared meaning from the categories identified in the first cycle (Miles *et al.*, 2014; Saldaña, 2015). Based on the Gioia template and pattern inducing technique, the logic is derived from the aggregate dimension that presents an explanation of the institutional practices encompassing material and symbolic aspects (Friedland and Alford,1991). This involves a constant process of data evaluation by coding raw data in the first-order group and establishing meaningful categories of second-order themes which constitute an aggregate pattern reflecting the institutional logic(s).

4.6.2 Thematic Analysis

In addition to pattern inducing technique, thematic analysis was used to capture the institutional pillars inductively from the transcribed text (Saldaña, 2015). Identification of the three institutional pillars (regulative, normative and cultural-cognitive: (Scott, 2014, 2011)) helps the researcher to understand and explain the wider context of institutional practices that frame the institutional logic at the institutional environment, and to study the interplay between the institutional pillars and institutional logics.

4.6.3 Use of NVivo Software

Computer software programs assist researchers in organising, sorting and searching for textual information quickly, and NVivo is an appropriate tool to systematically structure the data instead of hand-coding (Miles *et al.*, 2014; Creswell and Creswell, 2018). The qualitative data analysis software (QADS) also provides rigour to the research, and is widely used as a tool for data management and analysis (Woods *et al.*, 2016).

This research uses NVivo 10 to manage the large volume of primary and secondary data (Silver and Lewins, 2014), coding the transcribed text and grouping it into categories and aggregated themes. Organising the data manually is time consuming and it is difficult to track and retrieve data easily to make sense of it. Moreover, this research uses pattern inducing technique which requires substantial immersion in the data, an added advantage of

using NVivo[7]. NVivo also enables the researcher to continuously reflect on the findings from the analysis.

4.7 Research Rigour

Demonstrating research rigour is necessary to ensure reliability, validity and possible generalisability of the design and findings throughout the whole research cycle. Trustworthiness is an important aspect that demonstrates the rigour of qualitative research (Maher *et al.*, 2018). Validity determines if the research findings are accurate, and reliability determines if the research approaches are consistent and stable (Yin, 2014; Creswell and Creswell, 2018).

Generalisability is not normally an aim in qualitative research (Creswell and Creswell, 2018), especially as case study design presents an external validity. Although Yin (2014) argues that the findings from a qualitative case study can be generalised within a broader theory in a single case study and through replication logic in multiple case studies. This research is not intended to generalise the results to the whole population of developing countries, and offers only an analytical generalisation (Yin, 2014). To ensure external validity (generalisability), Yin (2014) recommends using theory in a single case study, in this research institutional theory and institutional logics. However, according to Lee and Baskerville (2003) framework on generalisability in IS research, the notion is either in theoretical statements or empirical statements. This research generalises from the empirical to the theoretical, that is from the case study to theory (Eisenhardt, 1989; Walsham, 1995), and the findings can therefore be generalised to other countries with similar institutional arrangements.

4.7.1 Validity and Reliability

According to Yin (2014), four tests are needed to ensure data quality in the research design: *construct validity, internal validity, external validity* and *reliability* (Yin, 2014). These tests are applied in this research, and Table 4.6 states the tactics applied in this research to ensure validity and reliability.

[7] See Appendix F - sample of NVivo 10 screens.

Table 4.6 Validity, Generalisability and Reliability – (adapted from (Yin, 2014))

Quality Measures	Description	Recommended Tactics	Tactics Applied
Construct validity	"Identifying correct operational measures for the concepts being studied"	• Use multiple sources of evidence • Establish a chain of evidence • Have key informants review draft case study report	The research uses multiple sources of evidence in the data collection, including interviews, focus groups and secondary data. Key informants were involved in the research. Appropriate analysis techniques are performed.
Internal validity (for Causal studies)	"Seeking to establish a causal relationship, whereby certain conditions are believed to lead to other conditions, a distinguished from spurious relationship"	• Do pattern matching • Do explanation building • Address rival • Use logic models	The research is not designed to establish causal relationships, so internal validity is not applicable.
External validity (generalisability)	"Defining the domain to which a study's findings can be generalised"	• Use theory in single-case studies • Use replication logic in multiple-case studies	The research uses institutional theory and institutional logics perspectives
Reliability	"Demonstrating that the operations of a study such as the data collection can be repeated, with the same results"	• Use a case study protocol • Develop a case study database	Case study protocol was adopted and reflected in the research methodology along with the use of NVivo software to create a database of the case study data

Since this research addresses an IS issue, it uses Klein and Myers (1999) seven evaluation principles, as illustrated in Table 4.7. According to Klein and Myers (1999)it is not required to be satisfy all the principles, and a single principle may be sufficient to ensure the research's validity and reliability. This study uses the *principle of contextualisation* as the researcher critically reflects on the social and historical background and how the OGD emerged, along with the history and past experience of IT regulators in managing different initiatives. Contextualisation is further reflected in the case descriptions as described in Appendix A.

The *principle of interaction* between the researchers and the subjects is also applied here, through critical reflection of the interaction with the participants from various macro- and

micro-level organisations. Finally, the *principle of multiple interpretations* accounts for different interpretations among the participants; different sources of data and data triangulation ensure the reliability and validity of the data.

Table 4.7 Set of Principles for Conducting Interpretive Field Studies (Klein and Myers, 1999)

Principle	Meaning
(1) The Fundamental Principle of the Hermeneutic Circle	This principle suggests that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. This principle of human knowledge is fundamental to all the other principles.
(2) The Principle of Contextualisation	Requires critical reflection of the social and historical background of the research setting, so that the intended audience can see how the current situation under investigation emerged.
(3) The Principle of Interaction Between the Researchers and the Subjects	Requires critical reflection on how the research materials (or "data") socially constructed through the interaction between the researchers and participants.
(4) The Principle of Abstraction and Generalisation	Requires relating the idiographic details revealed by the data interpretation through the application of principles one and two to theoretical, general concepts that describe the nature of human understanding and social action.
(5) The Principle of Dialogical Reasoning	Requires sensitivity to possible contradictions between the theoretical preconceptions guiding the research design and actual findings ("the story which the data tell") with subsequent cycles of revision.
(6) The Principle of Multiple Interpretations	Requires sensitivity to possible differences in interpretations among the participants as typically expressed in multiple narratives or stories of the same sequence of events under study. Similar to various witness accounts even if all tell it as they saw it.
(7) The Principle of Suspicion	Requires sensitivity to possible "biases" and systematic "distortions" in the narratives collected from the participants.

4.8 Ethical Considerations

As ethical consideration is an important aspect in qualitative social research (Myers, 2019) involving human participation, the researcher follows standard ethical guidelines. Initial approval to conduct the research in Oman was obtained from the ethical committee[8] of the University of Reading, and several other considerations were subsequently applied, including informed consent, voluntary participation, confidentiality and avoidance of any adverse consequences (Ritchie *et al.*, 2014; Miles *et al.*, 2014).

[8] See Appendix H - Ethical committee approval

A case study protocol was developed to ensure proper procedures to protect the privacy and confidentiality of the participants. All the interviewees were informed of the research purpose and objectives, and of the voluntary nature of the interview questions where a consent form is signed, stating all the terms and conditions. Confidentiality and the interviewees' anonymity were confirmed, with the interviews coded and all the research data stored securely.

4.9 Summary

This chapter explained the methodology selected for this research, from the rationale for selecting the interpretative paradigm to the selection of the single-embedded case study, allowing exploration of rich data and a better understanding of the topic. The case study strategy also provided rigour to the research, through validity and reliability. Data was collected from semi-structured interviews, focus groups and secondary sources, and triangulated. Qualitative content analysis was performed as an appropriate method to uncover the insights and explanations from the data.

Chapter 5 : Research Findings

5.1 Introduction

This research aims to explore the institutional logics that affect the emergence and adoption of OGD initiatives at the national level using Oman as a case study. The first chapter introduced the problem of OGD initiatives in developing countries. The second chapter reviewed the literature surrounding OGD and institutional logics, and the third reviewed the theoretical foundations of institutional logics and institutional pillars, by which the chapter proposed the conceptual framework. The fourth chapter justified the choice of research methodology design and the data collection and analysis method.

This chapter outlines the research findings that emerged from the analysis of data collected from primary and secondary sources, developing the conceptual framework using the Carrol & Swatman (2000) method as illustrated in Figure 5.1 (Carroll & Swatman, 2000). The analysis was carried out during two stages of the primary data collection, the pilot study and the main data collection, and from the secondary data collected from the institutional environment.

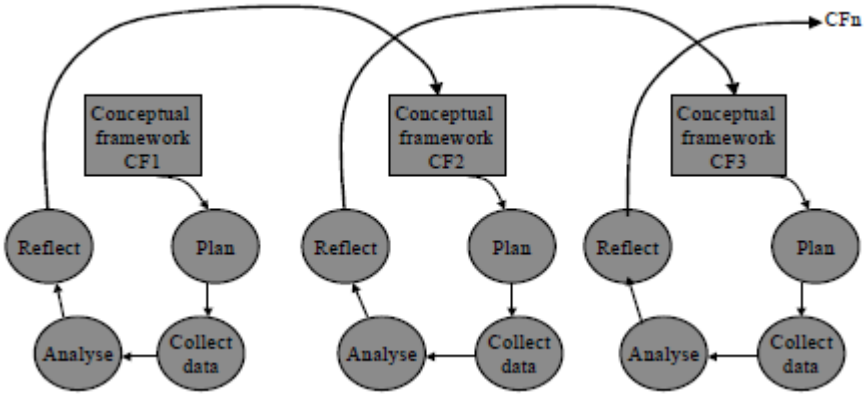

Figure 5.1 Framework Development cycle Adapted from (Carroll & Swatman, 2000)

This research analysed the data uses a rigor process through the pattern inducing technique where the logic captured inductively. Figure 5.2 illustrates how the data were analysed and highlight the process followed in the identification of institutional logic.

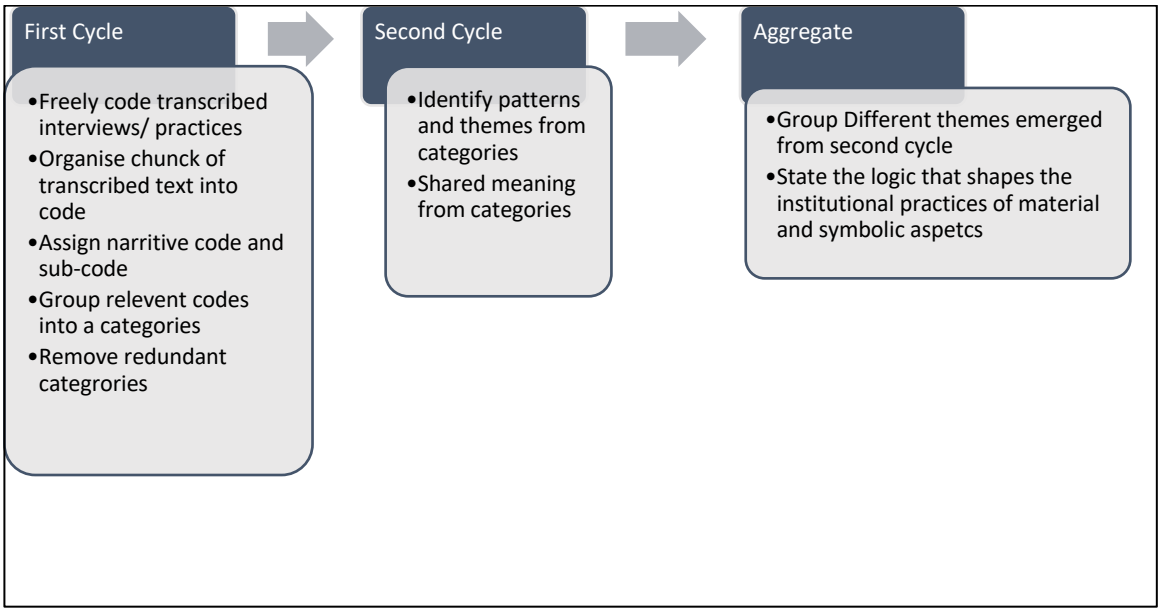

Figure 5.2 Data Analysis Process

The *pattern inducing* technique was used to capture institutional logics empirically (Reay and Jones, 2016), through interpretive analysis. Pattern inducting uses a bottom-up technique as follows:

> Researchers gather empirical textual data that range from interview to direct observation and often include personal experience. They then identify logics by analysing and coding (grouping) text in ways that show behaviour or beliefs guided by particular logics, attempting to draw on the concept of logics as both symbolic and material.
>
> (Reay and Jones, 2016, p. 9)

The main logic was derived from the second-phase coding, which added another layer to uncover the main themes and logics (Smets *et al.*, 2012), for reasons explained in the previous chapter. The logics are captured by analysing the data through coding and grouping them to show behaviour and beliefs from the phenomenon to highlight the material and symbolic aspects (Friedland and Alford,1991). Therefore, this process involves a constant process of data evaluation by grouping raw data into meaningful categories that constitute a pattern which reflects logic(s). To contextualise the identification process, the researcher followed the three-tiered approach of the Gioia's (Gioia *et al.*, 2013), template as a guiding

tool to analyse the data collected to support the *Pattern Inducing* technique to capture institutional logics qualitatively (Reay and Jones, 2015) . Following the research methodology outlined in Chapter 4, the researcher first coding the data using content analysis and secondly using thematic analysis. After applying the pattern inducing technique, several institutional logics emerged from the data that were grouped into four main logics.

The findings presented in this chapter address the research question and sub-research questions identified in chapter 1:

> ***How do the institutional logics affect the emergence and adoption of Open Government Data Initiative in the public sector?***
> - How do the institutional pillars affect the OGD in the institutional environment?
> - How do the institutional logics affect the OGD?
> - How does the interplay of micro- and macro-levels affect the OGD initiative in the public sector?

The following sections present the four institutional logics derived from the data.

5.2 Institutional Logics

Based on the interviews conducted during the primary data collection phase, and on the secondary data, several institutional logics were identified from the institutional environment, conceptualised, and aligned with the meta-theoretical foundations of the Institutional Logics Perspective (ILP). These meta-theoretical foundations incorporate five principles as identified by Thornton and Occasion (2012). The data analysis revealed multiple logics, one dominant and three competing (Thornton *et al.*, 2012) in the institutional environment of the OGD initiative in Oman. The dominant logic identified is *Institutional Acceptance Logic,* and the competing logics are *Institutional Roles Logic, Ownership and Control Logic,* and *Institutional Capabilities Logic.* These derived institutional logics, principles and their categorisation are illustrated in Table 5.1.

Table 5.1 Institutional Logics Captured

Institutional Logics	**Type**	**Cultural Elements (Values, Beliefs, Normative Expectations)**	**Embedded agency (*interests, identities, values, and assumptions)***	**Society as an inter-institutional system**	**Historical contingent**	**Institutions at multiple levels**
Institutional Acceptance Logic (IAL)	Dominant Logic	✓	✓	State	✓	✓
Institutional Roles Logic (IRL)	Competing Logic	✓	✓	State Professional	✓	✓
Ownership & Control Logic (OCL)	Competing Logic	✓	✓	State	✓	✓
Institutional Capabilities Logic(ICL)	Competing Logic	✓	✓	Professional State	✓	✓

5.2.1 Institutional Acceptance Logic

Institutional Acceptance Logic (IAL) is a term derived from the data collected, as it entails a collective acceptance, at macro- and micro-levels of the open data initiative. The IAL is considered as a dominant logic as it prevails at all levels of the institutional environment. IAL embodies five principles of institutional logic as illustrated in Table 5.1, derived from the different themes illustrated in Figure 5.3. It results from various first-order categories identified during the content analysis: *Open data driver* and *benefits realisations*. IAL is thus defined in this research as the *logic that drives organisations at macro- and micro-levels to adopt the OGD initiative with the objective of attaining projected benefits at the operational and strategic levels, resulting in an institutional acceptance consensus of the OGD initiative.*

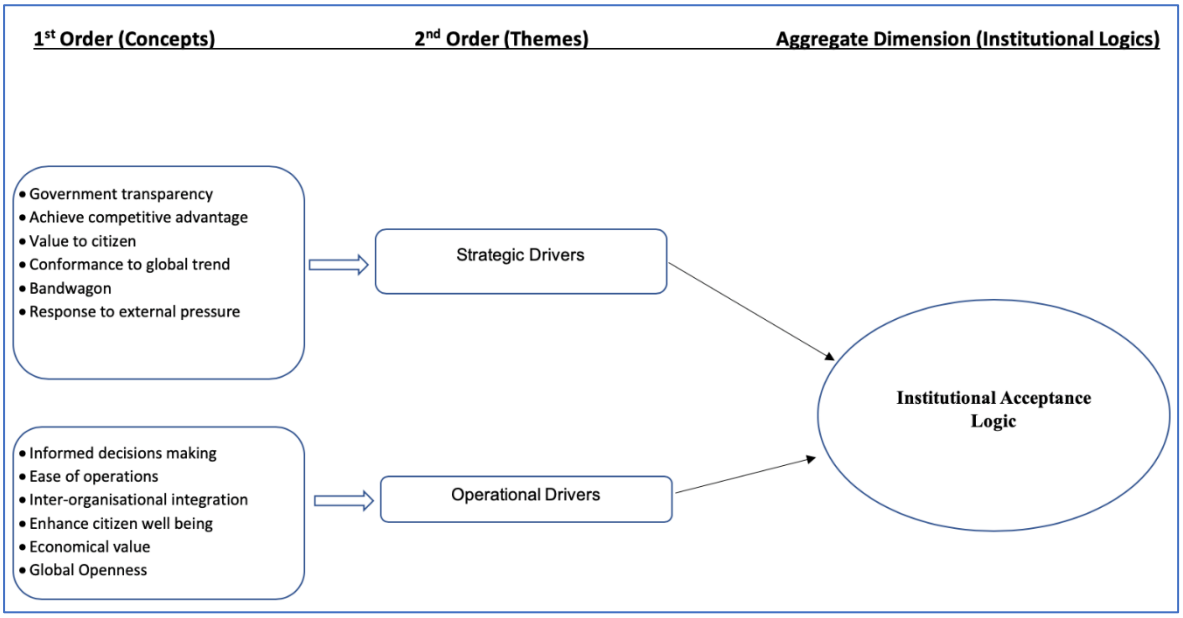

Figure 5.3 Institutional Acceptance Logic

Table 5.2 illustrates the main themes that constitute IAL: 1) strategic drivers; 2) operational drivers. Table 5.2 also identifies the institutional practices derived from OGD environment that formulate IAL.

Table 5.2 Institutional practices and observations formulating Institutional Acceptance Logic

Theme	Institutional Practices and Observations
Strategic Drivers	• Inauguration of OGD by the government to achieve : o Transparency o Citizen Engagement o Accountability o Increases country ranking • International community pressure on the country to implement OGD • The bandwagon of OGD movement by the global trend • Government organisations compete to launch sub-national OD portal
Operational Drivers	• Consensus from Government organisations to implement OGD to: o Achieve inter-organisational integration o Gain benefits towards the eGovernment transformation programme o Enhance the decision-making process by informed decisions. o Engage citizens in the decision-making process. o Generate economic value from the OGG. o Ease of access to the data to ensure global openness.

5.2.1.1 Strategic Drivers

The data revealed that the IT regulator introduced the practice of open data at the national level; it was also embraced by the data regulator. Also, organisations at the micro-level acknowledge the importance of the open data initiative, despite the various levels of participation. The structural element of the IAL was represented by the open data portal of the IT regulator in the initial stage; the data regulator's formal data portal (NCSI, 2017) to facilitate data openness to the public is a material aspect. Moreover, the data revealed that the OGD initiative is considered as part of the overall eGovernment transformation programme. A senior advisor stated:

> *"The open government data initiative is part of eGovernment to increase transparency of the government to engage citizen" (R23)*

Increasing government transparency is one of the main drivers of the OGD initiative. The deputy CEO of the IT regulator highlighted the importance of open data:

> *"Opening data had helped many countries. The main objective is part of the transparency of the government. We must be transparent; therefore, we must open the data. People have the right to know." (R12)*

Transparency is triggered by the public, the high demand pressuring government organisations to make their data openly available. One interviewee asserted:

> *"We used to provide the names of the candidates who pass the interviews or the exams; now we provide all the information and their detailed grades to all candidates; this was because of pressure from the candidates for more transparency." (R03)*

This represents social pressure, in terms of power, on the government to facilitate transparency. Moreover, organisations in the institutional environment are motivated to adopt OGD and play a vital role. One of the motivations observed was to increase the country's ranking in the regional competition. Several respondents acknowledged this objective, one respondent commenting:

> *"There was a GCC [Gulf Cooperation Council] competition about open data regionally, and that's why we started the open data. The objective is to take part in that competition." (R16)*

Similarly, an IT manager confirmed the importance of both the regional and national levels:

> *"This is a national imitative, and it is very important, we should provide the data to the people. It is important to the country, as it will increase the ranking of the country. We want to be in an advanced position, at least in the top 10! When the IT regulator encourages us to participate in the national competition for His Majesty's award, that motivates us to work more!" (R01)*

The initial driver to adopt open data had multiple facets. Most of the organisations adopting the OGD initiative aimed to compete with other government organisations, seeking a competitive advantage in terms of the services provided to society. An IT manager said:

> *"We will be in the top ten if not five for open data. We are in a competitive situation with other organisations, and we always want to be ahead, we have that culture" (R01)*

The competition objective is to be recognised by the other government organisations, especially by winning the annual award for Excellence in eGovernment (MoTC, 2018). However, organisations realised the OGD benefits are far more significant than this objective. An IT manager said:

> *"We started to trigger the subject when we were involved in His Majesty's award. We tried by that time to publish on our website; it was part of the main requirements of the award. The purpose was for the award itself, but over time we realised it cannot be only for the award" (R06)*

The latter motivation contributed to general acceptance of the OGD initiative, following the initial institutional practice of adopting OGD as window dressing or joining the bandwagon of the global trend for OGD. A respondent stated:

> *"We tried just to satisfy the IT regulator at that time, and it was only to show to the world that Oman has open data." (R30)*

The macro-level perspective on this motive agreed with the argument stated above; the IT regulatory authority acknowledged the role of UN ranking as a pressure motivating them to initiate open data. A respondent from the IT regulator stated:

> *"Everybody wants to be always on the top of the UN ranking, now if you see UN ranking in e-government, one of this is how far is the country mature in open data*

> *and big data, so we do not want to get badly hit in that particular area; … it is also peer pressure especially from neighbouring countries if they are doing this, then we also should do this (?)" (R11)*

Furthermore, the CEO of the data regulatory authority acknowledged external pressure from international organisations which rank the country in open data. The data regulator argues that the recent move of open data responsibility from the IT regulatory authority to the data regulatory authority stemmed from pressure from the international community.

> *"I think many international organisations did not see that the IT regulatory authority has covered the full open data." (R13)*

The international community puts pressure on the country to inaugurate an OGD initiative. Failing to adhere to community criticism affects the overall transparency of the country to the world and to the international organisations, which represent a coercive institutional force.

5.2.1.2 Operational Drivers

As illustrated above, there were many strategic drivers for organisations to join the OGD initiative in the initial phase. However, they soon realised that many benefits from OGD could be achieved operationally. Inter-organisation interaction is one of the main benefits, integration allowing organisations to collaborate with other to make more sense of the published data. The inter-organisational objective is thus to be achieved through open linked data. An IT manager highlighted the value of the link between OGD and inter-organisational integration as a means for open government. One interviewee acknowledged the practice of publishing linked data from another organisation:

> *"We are integrated with the Capital Market Authority and with the Muscat Securities Market where all the linked data is published in our portal. I think that is also open data." (R16)*

The macro-level consensus agrees with the benefits to government organisations from OGD. Moreover, the regulators also gain value as the benefits reflect the overall eGovernment transformation programme. A senior manager at the IT regulatory authority stated:

> *"For integration, this is why we are interested in open data, because we want government organisations to share data, we want them to share data for us to be successful in our integration and e-services" (R09)*

The ease of organisational operation through integration and the open data platform is another aspect highlighted by an advisor in a government organisation. The integration will ease the bureaucratic formalities in obtaining data:

> *"Open data will help us to get data from other government ministries without going through bureaucratic channels which are not accessible right now." (R22)*

Moreover, opening the data to the public reduces the operations in generating data based on demand and allows organisations to utilise their resource more effectively. A statistics manager stated:

> *"Now everyone requesting data will approach the ministry and an additional workload is added to us, but with open data, it will reduce the workload" (R02)*

Another benefit of open data acknowledged by a number of government organisations is to enhance the decision-making process by informed decisions. A senior IT manager highlighted the importance of the data in decision making:

> *"Big and open data will be more in decision making, as it helps the government on planning and on enhancing the services. I believe our top management support anything that helps to evaluate or help them in making better decisions" (R04)*

Furthermore, organisations gain benefits from open data by engage citizens in the decision-making process. Citizen engagement will transfer the burden from the organisation's management to the public. One open data manager commented:

> *"We need to engage citizens and hear their voices. Citizens need the data to see the reality before any decisions are made. Open data allows them to convey ideas and suggestions to the government" (R20)*

Creating value from the OGG for the national economy is another benefit identified in the institutional environment. The value of open data is not limited to making better decisions, but it extends to stimulate the national economy and business growth. One open data manager in one of the organisations stated:

> ***"****When I explain to the minister about open data, he appreciates having data opened as long it is accurate and helps the ministry in making good decisions… so it has value. When we have accurate data, we can make good decisions about business in Oman" (R20)*

Maximising economic value from open data is a valuable benefit realised by one government organisation. A senior respondent acknowledged the value to the private sector and to the national economy:

> *"And we have the other side of the culture. And I always look at it this way, which is the business. The business they want this information. They want to have access, and they want to read this data and to understand the demand, but they believe they do not have access to data" (R14)*

Open data also presents opportunities for small and medium enterprises (SMEs) to generate economic value by building applications. A senior manager asserted:

> *"There are certain data which help the public and give the opportunity for SMEs to build mobile apps or any other applications to assist organisations or to help the country to produce valid information for the public" (R04)*

In addition to the above, from the national level perspective the country benefits from publishing the data to the world. The objective is to provide ease of access to the data to assist other countries and international organisations in assessing the national economy and other features. An IT manager of the data regulator commented:

> *"The objective of this is not only to benefit Oman but also to benefit other countries and we will update them by regular update report" (R07)*

The dominant institutional logic present in the institutional environment, IAL, is the indicates that the organisations' behaviours and practices reflect a general acceptance of the OGD initiative. However, the data also revealed that the adoption and implementation are not fully institutionalised, as a result of the different competing logics in the institutional environment, discussed below.

5.2.2 Institutional Roles Logic

Institutional Roles Logic (IRL) is defined, in this study, as *the logic of an interpretation of practices and materials reflected by the roles and responsibilities of the organisations in the*

OGD institutional environment that encompasses the strategic direction, powers and authority, laws and regulations; and strategic management. The term IRL indicates the higher-level representation in the institutional environment; it stems from different themes as illustrated in Figure 5.4.

The archetypal themes result from various first-order categories identified during the content analysis of the collected data. The derived themes are powers and authority, strategic management, laws and regulations and the strategic direction of the Open Data initiative. These four themes contribute to the roles and responsibilities of regulators at the macro-level and micro-level of different organisations in the institutional environment. IRL is considered as a competing logic to the institutional acceptance logic of adopting open data.

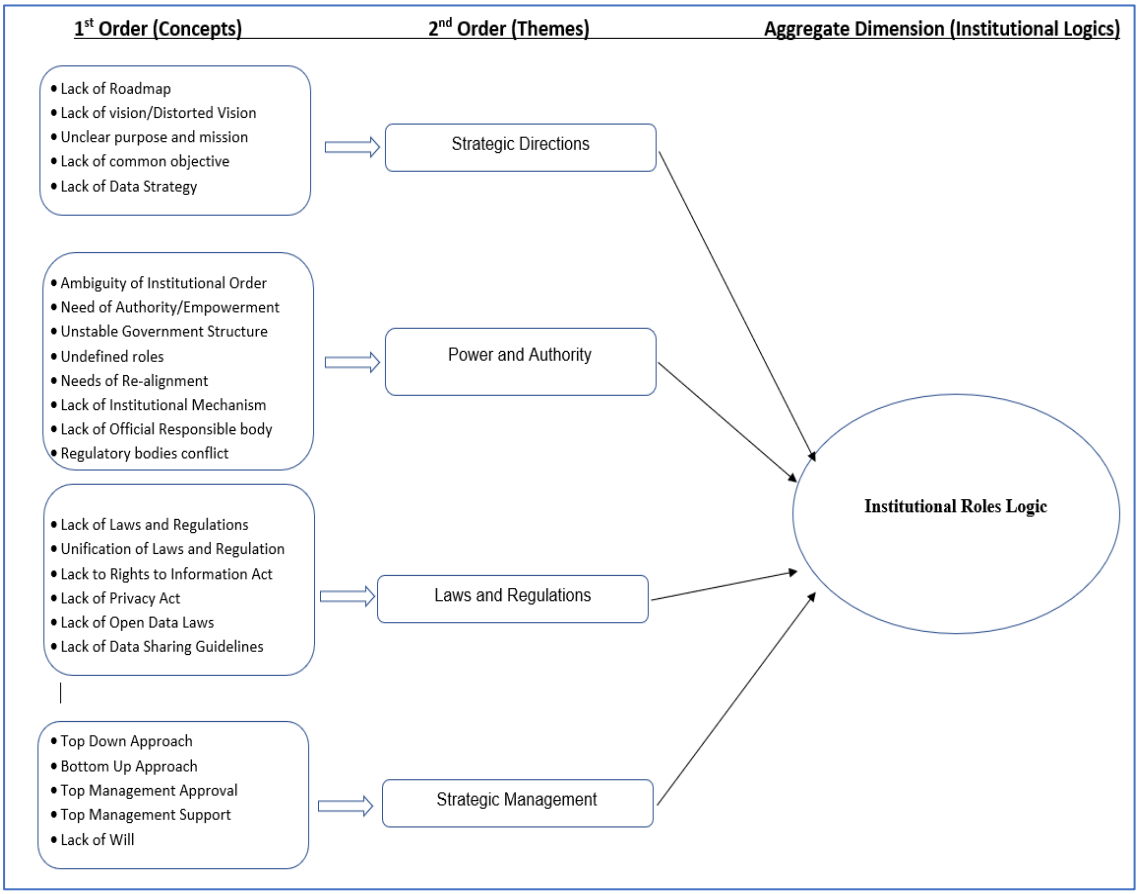

Figure 5.4 Institutional Roles Logic

Table 5.3 illustrates the main themes that constitute IRL: 1) strategic directions; 2) power and authority; 3) laws and regulations; and 4) strategic management. Table 5.3 also identifies the institutional practices derived from the institutional environment of open data that formulate IRL.

Table 5.3 Institutional practices and observations formulating Institutional Roles Logic

Theme	Institutional Practices and Observations
Strategic Directions	• Roadmap of the OGD initiatives not clear and not communicated to stakeholders. • The vision of Open Data is not clear to the stakeholder. • Lack of common objectives of Open Data initiatives and its value. • Unclear purpose and mission of the Open Data. • Lack of Data strategy at the national level is not presented.
Power and Authority	• The ambiguity of institutional order in presence unregulated responsibilities to IT and Data regulators led to a conflict that has affected the Open Data initiative. • IT regulator seeks empowerment and authority to allows them to enforce the implementation of Open Data initiatives • Governmental organisations do not follow the regulator directives • Lack of institutional mechanism led organisations to follow different approaches in adopting and implementation Open Data • The sense of realigning the roles and responsibility of different stakeholder.
Laws and Regulations	• There is a lack of laws and regulations that regulate the open data at the national level. • Lack of laws and regulations in Open Data allows organisations to either open or not to open their data. • Lack of unified laws and regulations of opening data to the public. • Uses other laws and regulation to complement the absence of unified law about open data • Lack of different acts and regulations that supplement the open data such as Rights to Information Act, Privacy Act and data sharing guidelines and procedures.
Strategic Management	• Different approaches implemented by the organisations' management in adopting and implementing Open Data • Fear of releasing data to the public by introducing higher level approval • Top management support to the Open Data varies by different organisations. • Lack of will by the leadership of organisations to adopt and implement Open Data.

5.2.2.1 Strategic Direction

The strategic direction is the first theme in IRL, as illustrated in Figure 5.4; it incorporates several identified institutional practices and behaviour as illustrated in Table 5.3. The strategic direction is an embedded aspect of institutional roles logic, where it focuses on how the OGD initiative has been formulated strategically at the macro-level. The strategic direction reflects how and why different organisations at the micro-level interpret the strategy and roadmap of the OGD initiative in Oman.

The Information Technology Authority (IT regulator) vision for the OGD initiative in the

initial phase was to share the government's data to enhance transparency and increase public participation. This vision was initially presented by the IT regulator to the media, reported for the first time by the Muscat Daily newspaper as:

> The Information Technology Authority seeks to work with the government entities towards an open government by ensuring transparency, enhancing public trust and participation, and improving the effectiveness of the governance process. It encourages every government organisation to open its data archives to the public to create a more transparent, participatory and collaborative government.
>
> (Muscat Daily, 2013)

The IT regulator has demonstrated a continuous effort towards open data since 2013. However, several stakeholders including the regulatory authorities and government organisations have contested the lack of organised national strategic direction for open data. At the macro-level, the IT regulator acknowledged the issue; when a senior consultant from the IT regulator commented:

> "*There should be a national-level roadmap for the open data like anything else we have" (R10)*

A senior advisor in another organisation acknowledged the lack of a roadmap for the open data in the organisation and stated:

> *"A defined roadmap is not yet there; we have just started to open our data, so we do support opening all our data to the public" (R23)*

The strategic direction at the national level is essential for all involved stakeholders to establish a roadmap for open data; it steers organisations at different levels towards adopting and implementing the open data initiative. Thus, the issue cascading down to the organisation level has caused a strategy misfit between different levels. An organisation which established an open data section in their portal in 2017 acknowledged the lack of a roadmap at the organisational level due to the absence of a national-level roadmap. This misalignment of national strategy and lower-level operational strategy of open data have confused the different organisations. They therefore tend to establish an open data section in their own public portals, eventually failing to achieve the stated vision at the national level. Furthermore, organisations reacted to the lack of a roadmap for open data by establishing

their own which may not be aligned with a national roadmap once established. A senior project manager of open data in one of the organisations stated:

> *"Regarding the roadmap, we are still working on the roadmap framework. I have already completed it, and I will forward it to the top management for approval" (R20)*

Despite the existence of strategic components such as the stated vision for the Open Data initiative, disengagement is observed between the macro-level and the micro-level in the behaviours and practices of the organisations. Moreover, the strategic direction for the OGD initiative was distorted and unclear to many organisations at the micro-level, as observed in a number of organisations, for example:

> *"We need national objectives about open data. Therefore the government should adopt this project to meet that objective. We need one national objective where all the organisations should follow the same direction" (R07)*

Another respondent confirmed this:

> *"No, the vision was not clear for us, and what was required from us to be published, we need to know what real open data concept is" (R06)*

Within the strategic direction of open data, several organisations referenced historical experience of other unstable initiatives managed by the IT regulator. Linking the experience of different eGovernment initiatives facing different issues contributed to the institutional trust issue between the IT regulator and the government organisations.

Several organisations are linking their experience with the IT regulator in different initiatives as a benchmark for the open data initiative. One of the significant experiences referred to is the eGovernment transformation programme, which was set to finish by the beginning of 2016. However, the IT regulator was unable to meet the target. Thus, several organisations are cognitively linking the OGD initiative with the eGovernment transformation initiative as an example of the IT regulator's work. There is a consensus among different organisations at the micro-level; for example:

> *"The IT regulator does not have a clear strategy on how to implement certain initiatives such as eGovernment plans and open data. The IT regulator does not have*

> *a clear view of how they want to do it, so eventually, this affects their support to us" (R03)*

Another respondent stated:

> *"E-transformation initiatives was supposed to be over by 2015 according to the strategy, but where are we? We have not achieved 50%. ITA does not have the power to pressurise any organisation" (R04)*

Although the IT regulator has recently published a short document entitled *Open Government Data Policy* (ITA, 2017b), the document is not comprehensive in covering an essential element such as the national vision and mission for the open data initiative. Unclear direction for the OGD initiative is widening the gap in collaboration between the regulators at the macro-level and government organisations at the micro-level.

The lack of a common understanding of the stated national vision for open data has resulted in failure to achieve an aligned strategic direction. This finding contributes to the institutional roles logic as the institutional environment lacks a defined responsible organisation for open data, despite the efforts of the IT regulator.

The following section discusses the findings related to power and authority and how it is related to IRL.

5.2.2.2 Power and Authority

Power and authority is the next second-order theme illustrated in Figure 5.4 and Table 5.3. The institutional practices derived from the institutional environment include ambiguity of institutional order; therefore, the need for empowerment and other practices related to regulating the open data initiatives is essential. Several observations and practices indicate that power and authority is one of the main themes in the open data initiative. The ambiguity in the institutional environment has resulted in a conflict between stakeholders within the institutional environment.

The power and authority of the regulatory authorities within the OGD initiative was confirmed by royal decree, although the role of the Information Technology Authority was limited to implementing the IT infrastructure and supervising IT initiatives at the national level. The data showed a consensus among respondents that the IT regulator's role in the OGD initiative is unclear. The vagueness is seen from different perspectives, but mainly the

power status of the regulatory authority within the institutional environment. Several respondents stated that the IT regulator authority lacks power over other government organisations to enforce implementation of open data. One stated:

> *"The role of the IT regulator till today is vague for some of the organisations" (R04)*

The ambiguity of duties and appropriate segregation of roles within the institutional environment has contributed to this issue as authority has not been assigned appropriately to the regulator. The vagueness of the regulatory authorities' roles has been identified in the data concerning the involvement of the IT regulator in operations, the segregation of duties and an unstable government structure. The involvement of the IT regulator in IT operation at the micro-level is one of the aspects referred to in the context of open data portal operations and management. The IT regulator's operations are not aligned with the roles assigned and mandated by the royal decree. Several respondents contested the role of the IT regulator in managing the operation of the open data portal, and suggested assigning this role to another organisation; for example, a senior respondent asserted:

> "The *IT regulator should direct and regulate all IT-related projects in the government, and someone else should handle the operational aspect of IT initiatives. The IT regulatory body should play the role of regulator only, and another entity should manage the operation" (R08).*

Similarlry, a manager from another organisation stated:

> *"ITA [the IT regulator] is supposed to be involved from the IT regulations perspective, not from the business operations; they [ITA] are not playing their role*" *(R06)*

Oman's government recognised the need to assign the correct roles and responsibilities in the institutional environment, in particular from the data regulations perspective. Accordingly, a royal decree in 2012 established a data regulatory authority. However, the responsibilities of the IT regulator and Data regulator regarding open data overlapped, and the borderline between the roles of the two regulatory authorities is not clear. Thus, failure to segregate the duties of the two regulators has contributed negatively to the Open Data initiative. This is a competing logic within the institutional environment and is reflected in the organisations' behaviour at the macro-level. A senior manager at the IT regulator

acknowledged the lack of coordination between the IT and Data regulators and argued that there is a need for rationalisation of their roles:

> *"Do you believe that the Data regulator should also be the implementer!! they need to do the framework…etc. I think, when it comes to other aspects like technology and data warehouse and the analytical tools, it does not have to be implemented by the Data regulator" (R11)*

There is a greater sense from the IT regulator's management that open data is their responsibility rather than the Data regulator's, specifically on the operational side. A senior consultant in open data commented:

> *"Then they[data regulator] contradicted with our role" (R10)*

Organisations at the micro-level demanded the authority to regulate how they should open their data and share it with the public. The organisation responsible for formulating and introducing the regulations is not specified within the institutional environment. A senior respondent argued that the regulations are a vital factor for eGovernment and integration, as they allow the organisations to open and share the data by inter-organisational means. This argument extends the benefits to include acceleration of the eGovernment transformation programme. A senior respondent commented:

> *"It is essential for us to establish integrations between government organisations. We will not be able to convince government organisations to share anything through the integrations without having the right policy; whether it comes from data regulator or Ministry of Legal Affairs or anybody else, we are very interested as a stakeholder to have this in the place" (R10)*

According to the IT regulator website, royal decree No. 52/2006 promulgated on 31 May 2006 the formation of the Information Technology Authority (ITA), addressing the ITA's roles and responsibilities as follows:

> ... financially and administratively independent national authority established to lead the implementation of the eOman initiative and bear its national vision and objectives. ITA is responsible for implementing the national IT infrastructure projects and supervising all the projects related to implementing Digital Oman

> Strategy while providing professional leadership to various other e-Governance initiatives of the Sultanate.
>
> (ITA, 2015)

In 2012, a royal decree promulgated the National Centre for Statistics and Information, followed in 2014 by another that outlined the system for the Data regulator; it comprised a number of articles with the objective of empowering the NCSI as a data regulator (NCSI, 2017), including:

- Providing technical supervision over the management and organisation of statistical and informational work in The Sultanate.
- Publishing and making available the information and the official national statistics at both the national and international levels.
- Providing technical assistance to other government organisations in the field of statistics and information.

The royal decree for formation of the data authority mandated the responsibilities of all data publishing in the country to the data regulator. Based on this mandate, and from the point of data dissemination responsibility, the Data regulator demanded the right to operationalise the open data initiative, which eventually created a conflict between the IT and Data regulators. The conflict destabilised the OGD initiative in the institutional environment. The power struggle between the regulatory authorities has affected the open data initiative, where government departments at the micro-level are not able to achieve their objective of opening their data to the public. The conflict has led to having two open data portals at the national level: the IT regulator's initiated in 2013 and later the Data regulator's (NCSI) which was claimed to be the national data repository representing the national open data portal. A senior executive from the IT regulator asserted that the IT regulator's role is to operationalise open data under a central initiative, with collaboration with the Data regulator:

> *"The data regulator (NCSI) should align with IT regulator in future because it is the data regulatory body hosting the data repository for the country; thus the Data regulator needs to collect these data somehow, and the central portal of the IT regulator will be hosting the governments' data" (R09)*

In contrast, a senior manager from the Data regulator argued against the involvement of the IT regulator in the operation of open data, claiming that the IT regulator is not responsible

for open data or any data-related initiatives, and that the authority was assigned to the Data regulator in accordance with the royal decree:

> *"For open data, we should be the champion of open data, and the IT regulator should help us in this. They should not collect data; they should do the policy. We think we are the right organisation for the open data" (R07)*

Another finding from the data revealed that the IT regulator lacks power over other government organisations, as identified not only by the government organisations but also by the IT regulator. The IT regulator relates this issue to the laws and regulations and financial aspects. Thus, the IT regulator's role is limited to *directing and advising* government organisations to open their data rather than to *regulating and enforcing*. The role of IT regulator shows a lack of empowerment from the government. The deputy CEO of the IT regulator asserted:

> *"The law does not give us anything. For example, when a government organisation asks for a budget and human resources, the IT authority can only help to facilitate providing the budget from the government, but we can not provide it directly because we do not have a centralised budget. Our objective is to direct, but we cannot enforce" (R12)*

This is reflected by sentiments from several respondents who acknowledge the *authority and empowerment* issues and confirmed that the IT regulator's role is limited to collaboration. The IT director in one of the organisations commented:

> *"The IT regulator asked us to open and make data available to the public. However, I do not think they have the power; they do not have the power to force us" (R17)*

The role of IT regulator stemmed from the mandate assigned to it by the royal decree in 2006. The government mandated the IT regulator to look after the IT initiative in the country. According to the vision of the IT regulator:

> ITA works with a vision to transform the Sultanate of Oman into a sustainable Knowledge Society by leveraging information and Communication Technologies to enhance government services, enrich businesses and empower individuals. ITA's [mission] is pioneering the implementation of eOman. eOman comprises of a wide range of initiatives and services that are designed and created to improve the

> efficiency of government services, enhance the activities of businesses and empower individuals with skills and knowledge, to meet society's needs and expectations and to direct Oman towards becoming a sustainable Knowledge-based Economy.
>
> (ITA, 2015)

However, the vision and mission of the IT regulator show that it has an advisory role in developing the information technologies of government's organisations. This advisory role does not sufficiently empower the IT regulatory authority, which is affecting the open data initiative. An IT manager in one of the government's organisations highlighted this issue:

> *"When the ITA was established, the government mandated their main responsibility, which was to advise and to consult government organisations. ITA cannot force us to implement a certain solution. They do not have the right" (R12)*

In contrast, the Data regulator claims the empowerment to handle the open data and any dissemination of national data. This claim results from the organisation hierarchy as the data regulatory body reports directly to the Supreme Planning Council headed by His Majesty the Sultan. On the contrary, the IT regulator has no direct link to the council; the organisation is structured, where the IT CEO reports to the board and is not directly linked to the Council of Ministers. The IT director of the Data regulator commented:

> *"In his speech in 2013 His Majesty the Sultan directed all the government organisations to provide data to the Data regulator only. Moreover, from the hierarchy perspective, we are working under the Supreme Planning Council which is headed by his Majesty" (R07)*

As a result of the conflation of the roles between the regulatory authorities, several respondents at a high level indicated the need to re-align and establish the correct roles and responsibilities of each regulator. A recent change to the roles of the body responsible for operationalising the OGD initiative was indicated by the CEO of the Data regulator:

> *"Now we have agreed with IT regulator to stop publishing data on their portal, as it is better to publish in our data portal because we have the rights in accordance with the law to speak and to ask all entities in the country to provide data. This is a responsibility that has been given to us" (R13)*

However, any adjustment to the roles and responsibilities requires intervention from the

highest authority in the country, so the problem persists with both regulators claiming the right to operationalise the open data. In 2017, the IT regulator launched a national open data portal at **http://oman.om** which is managed and maintained by the IT regulator, showing that the conflict still exists at the macro-level with the two repositories being maintained independently by the two regulators. This uncontrolled and unstable environment and the lack of a clearly responsible entity has discouraged some organisations from opening their data to the public.

Despite the claim that the Data regulator is the only responsible body to publish data, other government organisations have been motivated to establish an independent open data portal from the national data portal; for example, the Ministry of Manpower's open data portal https://www.manpower.gov.om/OpenData/home/home**.** The project manager of open data in this ministry of Manpower indicated that the data should be open to the public in both centralised and decentralised forms at the same time:

> *"We are part of the Data regulator's data portal, and every organisation should have their own open data portal. Our open data portal is at the organisation level, and we should have it as we own the data. I think the IT regulator should provide tools and technology to help organisations in opening their data" (R20)*

From the above institutional practices and observations, the roles and responsibilities represent a conflicting logic which exists at the same time as the dominant logic enforced by the IT regulator in a different direction. Overall, the conflict in the institutional environment among different actors plays a vital role to shift the dominant logic into competing logic. The co-existence of two logics affects the OGD initiative through the conflict between the regulators. However, neither the dominant logic nor the competing logic has yet prevailed, mainly with the move of the IT regulator to control the open data initiative.

The next element of the Institutional Roles Logic is the laws and regulations, explaining *what, how and why* the laws and regulations contribute to the IRL.

5.2.2.3 Laws and Regulations

The laws and regulations represent the third second-order theme in IRL, as illustrated in Figure 5.4 and Table 5.3. The elements of this theme are derived from the data by observing and identifying the institutional practices of different organisations. The practices are related

to how laws and regulations shape the organisations' behaviour toward the open data initiatives at the macro- and micro-levels.

Laws and regulations determine the position of organisations stand in the OGD initiative and are reflected in the in their adoption and implementation of open data. The lack of regulations and legislation about open data and data in general frames the institutional behaviour which is connected to the institutional roles and responsibilities logic. The lack of appropriate laws and regulations has been acknowledged by both the IT and Data regulators, and by most of the interviewees. One interviewee commented on what data they can open and publish:

> *"We do not have clear written law on what can be published or not" (R30)*

Another senior respondent commented on how the limitations of the laws and regulations have affected their operations:

> *"Do we have first of all laws and regulations? still, we have no proper laws and regulation for the open data or big data" (R04)*

The lack of national laws and regulations for open data is one of the obstacles to organisations opening their data. One respondent commented that they use a standard agreement between different parties to exchange their data with others:

> *"No, there is no law. We have a standard agreement which we normally sign between us and other entities to exchange the data" (R05)*

As the open data is not regulated at the national level, some organisations use this as an excuse for not opening their data to the public. They choose to protect their data from opening for many reasons. Several organisations interviewed argued that the data could not be published because of sensitivity and privacy issues:

> *"We do not have rights to publish to the public any data that affect privacy" (R30)*

Data privacy is not only related to opening data to the public, but has been extended to opening it to other government organisations:

> *"We worry if another organisation abuses the use of the data, so we worry about confidentiality and privacy of individuals" (R29)*

The IT regulator acknowledged the absence of a privacy act at the national level, and a senior respondent commented:

> *"The question is what to publish... We need a privacy law" (R12)*

At the same time, other organisations consider the lack of open data laws and regulations as an opportunity to publish and open their data. Those who demand openness seek legitimacy from different sources. The limits of laws and regulations for open data specifically and data in general have encouraged different organisations to interpret them to allow them to open or limit specific data to the public.

Some government organisations have used specific laws to legalise the opening their data to the public. For example, the commerce laws and labour law are seen as a legal base to open data such as shareholder data sets. A specialist in one of these organisations stated:

> *"From a legal perspective, the law here in the Ministry is supporting us in offering open data and providing the data. We have a clause in the commerce law that says any data registered in the commercial registration is public data" (R16)*

In the other direction, the absence of national laws and regulations for open data has shifted the burden from subordinate departments in the organisation to higher management. For example, in particular organisations, approval from the top management is a mandatory process in opening the data to the public. One respondent said:

> *"We do not have any law, but most importantly we do not release any data unless the top management approves it" (R02)*

The ownership of the OGD initiative and the conflict between the IT and Data regulators has resulted in un-unified laws and regulations in the institutional environment. There is no organisation responsible for formulating and initiating all the regulations related to open data. The Data regulator argues that openness will be regulated by the new law on statistics and data strategy, which has not yet been approved. A senior respondent articulated this in the following statement:

> *"We are preparing a new law, a "Statistics and Information Law". I think a new law should be clearer. However, it must be approved by the Coucil of Ministers and Parliament. It is ready, and it has been accepted by our partners, so one will say we*

> *should have a data strategy. This will give us power for the data strategy and open data and will help the eGovernment transformation" (R13)*

There is a consensus among respondents on the need for unified laws for open data to allow them legally to open their data to the public. Unification of the laws and regulations related to open data is an essential element for the open data initiative. As stated earlier, the IT regulatory authority's 2017 *OGD Policy* is generic and not sufficiently comprehensive to cover detailed articles and regulations related to open data. One respondent commented on that:

> *"We need a data policy to articulate which data is owned by which organisation. Which organisation should have access? We need unified laws and regulations, we need one main objective for this, so everyone is going in one direction" (R07)*

Ultimately the lack of a responsible entity to regulate open data has deepened the issue. Both the IT and Data regulators recognise the problem and have demanded the government at a higher level to regulate open data and its related issues. This demand passes the burden of initiating laws and regulations to the government. Equally, the IT regulator argued that their role is not to issue laws and regulations, abandoning the responsibility based on the claim that they are not in a situation to initiate laws, especially those laws related to privacy and right to information acts. Despite these arguments, the regulators should initiate the process, based on their experience and knowledge of open data. A senior respondent from a regulatory body stated:

> *"For the IT regulator, it is imperative to establish integration between government organisations, and we will not be able to convince government organisations to share anything through the integrations without having the right policy, whether it comes from NCSI or Ministry of Legal Affairs or anybody else. We are very interested, as a stakeholder, to have laws and regulations in place" (R09)*

The call for the government to intervene by initiating the laws and regulations comes not only from the regulators, but also from government organisations. They ask for a higher national authority to intervene and issue directives to formulate new laws and regulations related to open data. The government organisations believe that the government's role is to

initiate the laws, while the regulatory authorities formulate all the relevant policies and regulations: related:

> *"The laws should come from the Council of Ministers, and the regulators are to formulate rules and regulations that every Ministry to facilitate open data related to them. There should be some rule that says "all this data should go to Open Data" (R17)*

Other legislation also needs to be formulated to encourage the open data initiative, such as *the right to information* and *data privacy.* Several organisations highlighted the importance of the former as a way of allowing the government organisations to open their data to the public. A data protection law and privacy act were also raised by interviewees. The plea for data protection law by the community and data specialists has been acknowledged in a local newspaper article, which stressed the need for a data protection law in the era of online services:

> The current legal framework in Oman is certainly insufficient and does not cover the basic data protection concerns of users in the country. The Information Technology Authority has announced in previous years that it has plans to prepare a data protection law, but the status of this law is unclear at the moment.
>
> (Riyadh, 2016)

5.2.2.4 Strategic Management

In response to uncertainty about open data in the institutional environment, different management styles are employed by different organisations. The management intervenes overall when the roles and responsibilities are not clear or well defined. This practice has added a burden to organisations' top management level, for instance, in supporting the IT regulatory authority's project in 2013. The enforcement is a top-down rather than a bottom-up approach, identified as an initiative formulated at the national level. A senior manager of the IT regulator stated:

> *"It is top management from the CEO level who understand the necessity of the open data initiative, and that is why we have initiated open data" (R01)*

The selection of a top-down approach by the IT regulator is to present open data to the world and the local IT community. A deputy CEO IT regulator stated that higher management is fully supportive of the open data initiative, and acknowledges the approach as top-down rather than bottom-up:

> *"It is merely a top-down approach for the open government data initiative to succeed if you want to be known as one of the countries celebrated as an open country, and as we want to be ranked at the top, we have to have this standard" (R12)*

In contrast, several government organisations argued that the initiation of open data within government organisations was triggered from the bottom upwards. Several respondents criticised this bottom-up approach as it introduces problems in the future for top management. The latter observation shows the absence of top management involvement at the micro-level in initiating and supporting the open data initiative. One interviewee explained how open data is managed in their organisation:

> *"Top management is not involved in the Open Data initiative, only IT and eGovernment committee which have members from business owners. We have to finalise this phase with IT regulatory authority and then involve the top management" (R06)*

The uncertainty of how open data should be handled in the institutional environment has hindered several organisations from opening their data. The top management was involved at the micro-level where they have to approve the opening of every dataset to the public. Another management style within the institutional environment prefers not to announce the opening of data to the public. The behaviour is merely related to fear from the public in how the data is interpreted and analysed. A senior respondent asserted:

> *"The top management supported the opening of the data, stating that we should provide it gradually, that is why the management prefer to open our data gradually. They do not want a big bang impact of Open Data" (R17)*

Different management strategies are present in the institutional environment. Although one is in favour of opening the data to the public and other governmental organisations, the openness is not institutionalised or systemised without the intervention of management. When asked if the top management supports data openness, one respondent said:

> *"I cannot say yes ... for the government to government is clear, and they are supporting this, but for the public, it is still not clear.The main authorisation to open data and publish it is from top management level, not our level" (R30)*

In a different setting, another organisation stressed the need for the approval of top management as well as the concerned departments for opening and sharing data, even for sharing the data with other government organisations. The practice resulted from lack of data-sharing guidelines which would allow different management styles to be represented in the institutional environment:

> *"We need guidelines whether we should provide or not, we do not have to get the approval from the top management. We need the administrative approval for any data we share with the data regulatory authority. If it is coming from one department, then we sit with them, and if the data can be published, then we share" (R03)*

The different practices of top management are related to the institutional roles logic, as the roles and responsibilities are not set and mandated to different organisations. Thus, different behaviours are present in the institutional environment that hinder the progress of adopting and implementing open data.

5.2.3 Ownership and Control Logic

Ownership and Control Logic (OCL) is defined in this study as *the logic of different institutional practices and materials in the OGD institutional environment that resist data openness due to the logic of Loss of Privileges and Control, Fear of Criticism, and Data Governance*. The term Ownership and Control Logic extracted from the data represents how ownership and control affect the open data initiative. The themes that emerged from the content analysis are illustrated in Figure 5.5 All are intertwined with the ownership perspective of data.

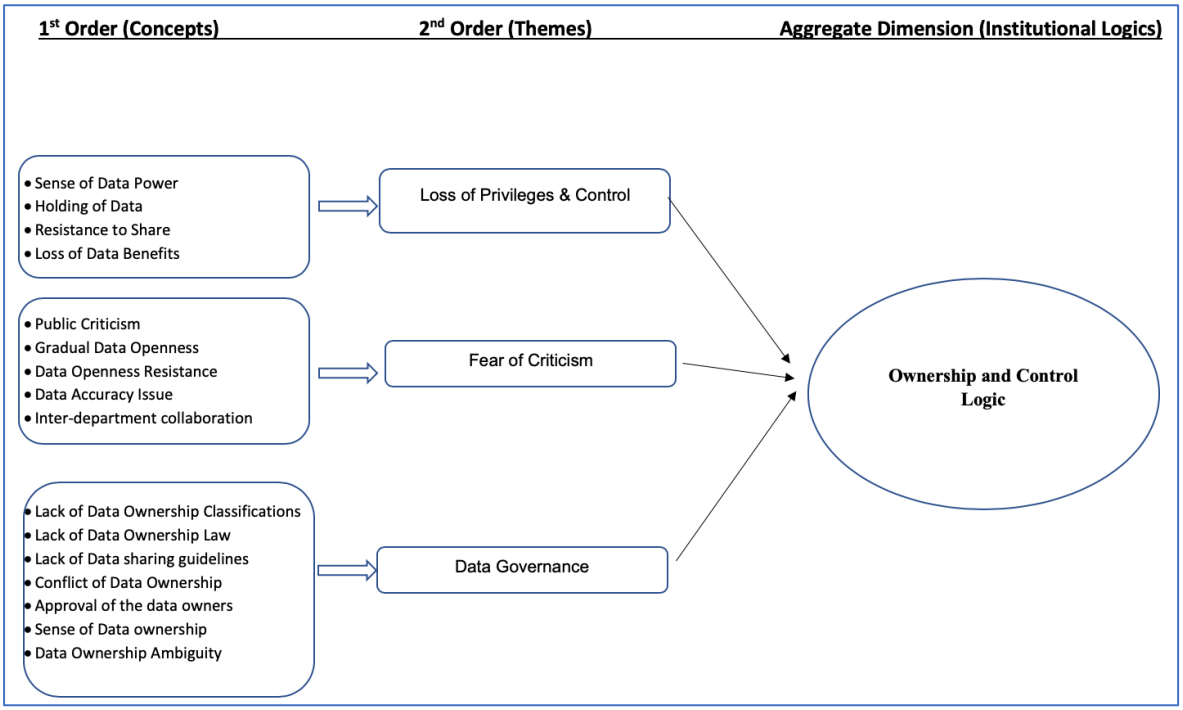

Figure 5.5 Ownership & Control Logic

Table 5.4 identifies the institutional practices and observations derived from the institutional environment that formulate OCL. The practices frame the logic as it embraces the five principles of Institutional Logics.

Table 5.4 Institutional practices formulating Ownership and Control Logic

Theme	Institutional Practices and observations
Loss of Privileges	• The sense of loss of privileges if data opened • Loss of financial benefits • The resistance of Sharing and opening data to certain organisation. • Loss of data benefits if data became open and available to the public • Avoidance of opening detailed raw data.
Fear of Criticism	• Fear of public criticism by opening the data to the public -being exposed to the public • Resistance to open data to the public • Lack of inter-organisational collaboration • Fear of Data unifications, data accuracy and standard. • Lack of trust in the data organisation hold.
Data Governance	• Lack of data classifications • Unclear ownership of data • Lack of data ownership guidelines and standard • Lack of data sharing guidelines • Data ownership ambiguity

5.2.3.1 Loss of Privileges and Control

The loss of privileges and control is related to the practices and behaviours of organisations holding data with the objective of attaining certain privileges. The withholding of data is a form of resistance by organisations at the micro-level to sharing and opening data to the public.

The resistance comes from the belief that power over data is lost when it is released to the public, affecting the organisation's status quo in controlling the data. The loss of privilege from retaining data is related to ownership, from the perspective of unclear ownership of data within the institutional environment. The practices were identified by several respondents who confirmed that organisations resist opening their so as not to lose certain privileges that they currently possess. An IT director said:

> *"Most of the government organisations think it is their data and they are worried and afraid to provide it to anyone else" (R01)*

The general director of a statistics department indicated that resistance came from different departments, especially those which control and maintain the data in the organisation. The director reasoned that these departments would lose the privileges they gain from the data. In addition, resistance to change affects how organisations operate, as change is another aspect of loss of privilege:

> *"We face this whenever we introduce new things and new ways, we face resistance from the people, they think it will take privileges from them, and they believe that the current way is the right way" (R03)*

Although public sector organisations are considered to be not-for-profit, they are still concerned about the revenue they generate, in a similar way to profit-making organisations. Certain organisations generate revenue by providing information to customers for a fee, and fear the loss of this revenue if they open the data to the public. Open data principles (Open Knowledge Foundation, 2012; Open Knowledge International, 2018) allow the public to have free access to data, conflicting with the practices identified in the institutional environment of open data in Oman. This practice:

> *"... has a relation to income and revenue; certain directorates do not want to share data as it will decrease their income/revenue from the customer" (R30)*

A data regulator agrees about the loss of other privileges, such as recognition and representation in the international community:

> *"We think that the government organisations are getting benefits from the data, as when an organisation open their data, they lose benefits such as dealing with international bodies. They[organisations] do not want to give away that role as they will lose privileges" (R07)*

In contrast, an advisor in another government organisation argued that the organisation would not lose privileges by opening and sharing the data. The loss of privileges would be overridden by publishing aggregate data instead of detailed raw data, gaining public satisfaction and enhance the organisation's image with the public. However, this practice contradicts the transparency objective and principles of open data:

> *"I think if we publish aggregate data as we do, it will not affect us on the dominance of the data" (R18)*

Despite the institutional practice of different organisations over transparency, the IT regulator argued that the government should be transparent to the public and acknowledged that the transparency is one of the main objectives of the OGD initiative in Oman:

> *"Open data objective is part of the transparency of the government. We have to be transparent and open. People have the right to know" (R12)*

The two conflicting logics represent a disconnection between the macro-level objective of achieving a transparent government and organisational behaviours at the micro-level. The main argument represented in this section is the power of data and fear of its loss. Nevertheless, at the same time organisations are not maximising the value of the data they hold.

5.2.3.2 Fear of Criticism

Fear of Criticism arises from the reactions of the public, other government organisations or even international organisations and community. One director described the management practices towards the OGD initiative as a "conflict avoidance". Government organisations

avoid conflict by resisting open of data because the public might raise questions about the management's decision-making process, daily operations and business processes. One respondent articulated this as:

> *"I think decision makers are trying not to reveal data to avoid public criticism. The management is trying to keep the information in their custody" (R08)*

Revealing organisational data allows the public to analyse it in depth from different angles. Organisations fear that data analytics will shed light on improper practices. Moreover, they argue that they need to streamline their processes internally and eliminate any misuse of power. An IT specialist highlighted this issue:

> *"Everybody is worried that anyone will discover what we have here and what we do. We have some corruption sometimes, in some entities. The corruption makes the organisation insecure about opening data. The Ministry should solve the corruption before they open their data" (R17)*

In a similar direction, another organisation argued that public access to data would introduce different interpretations according to how data is analysed. Moreover, the public will demand additional data to make sense of what they already have, requiring the organisations to have a logical presentation of data published. A statistics department manager said:

> *"We fear if people dig inside the data, then this is an issue and concern! The public will start criticising us as the data is not logical!" (R02)*

Data accuracy is another factor contributing to the fear of criticism. To avoid this issue, organisations tend not to publish detailed raw data to the public to avoid criticism and the need for data validation. One organisation interviewed argued that they publish aggregate data rather than raw data. A respondent at managerial level commented:

> *"We do not have any fear of the data, but we fear the data accuracy is not there" (R01)*

Similarly, a senior respondent said that open data might introduce a public inquiry into the organisation's data, which could lead to a legal dispute between the organisation and the public:

> *"We publish aggregate data only. Otherwise, people will have a right, according to the law, to take us to court if they find out the published information is inaccurate" (R13)*

Organisational culture either hinders or promotes data openness. A culture of blame from higher management hinders the organisation from opening data to the public or other organisations. It was observed that organisations avoid publishing data as they may face criticism from the top management or a different organisation. One respondent stated :

> *"If I decide to open some data today, maybe tomorrow someone will come and blame us for opening this data" (R30)*

OCL entailing resistance to data openness was found in several organisations in the institutional environment. Although the resistance is triggered at the micro-level, the result is felt at the macro-level. The practice encompasses cultural aspects of public organisations. The complexity of the institutional environment of the OGD initiative involves diverse cultures of different organisations, although all are part of the public sector. Nevertheless, cultural differences exist within the institutional environment; thus different cultural backgrounds and different organisational cultures reinforce the challenges to the open data initiative.

5.2.3.3 Data Governance

Data Governance is related to the practice of data withheld by the organisation as a result of poor regulation, including inadequate classification of data and data ownership, and the absence of data-sharing guidelines. Data ownership means who owns what and at what level. The issue of data governance was highlighted by many respondents, and a a senior manager described it as halting the open data initiative:

> *"Data ownership hinders us from opening our data. This is a government debate between government organisations" (R14)*

Government organisations claim rights to the data they create and own, and argue that they are not obliged to open the data to the public. An open data consultant in the IT regulatory authority stated that organisations are not willing to share all their data:

> *"It is "my data"!! The organisation feels it is its data and argues that it has generated it. This is an ownership issue; thus, organisations are not willing to share all data. Organisations say I will share some information and I will not share all" (R10)*

The sense of data ownership is anchored in most of the organisations interviewed, and ownership issue hinders them from opening their data to the public. An IT director said:

> *"In my opinion, data cannot be published because the Ministry owns it, so we cannot show our data to others" (R03)*

The lack of national data classification is a contributory factor to the data ownership issue. Organisations start to set their boundaries and classification especially when enterprise data encompasses individuals' data. Moreover, data ownership involves complex relationships between different data sets from diverse databases. The complexity of ownership allows organisations to debate and slow down the OGD initiative at the national level. They argue that the data they hold is not entirely theirs when it is integrated with or originates from that of other organisations. One respondent argued that the data they hold is linked data and so has not been opened to the public:

> *"I am worried about data ownership as data are integrated with many sources, but we only publish our own data sets. Otherwise, we will be blamed if we publish others' data. We are not the owner of the linked data as it may have discrepancies in data. Therefore, we have to be very careful when we open the data" (R20)*

Vagueness about data ownership and its access level in the institutional environment has led to different interpretations of what and how data ownership is classified, especially with data obtained from diverse sources. Several respondents indicated this, and one said::

> *"We realised that we do not own the data, because the data are gathered from other organisations, so we do not own the data" (R05)*

Similarly, another respondent argued that they were not able to open data unless it had been authorised by the originator:

> *"We own only our data; if we have the authorisation from data creator to publish linked data, then we are the owner of that data" (R18)*

Data ownership also drives organisations into the realm of privacy issues, as they are not able to share data that affects individuals' and organisations' privacy. Thus, organisations share analysed data sets in an aggregate format as a way of overcome the breach of privacy. One organisation does not open data linked to different organisations' sources due to the privacy aspect:

> *"We do have the data, but that does not mean we own all the data. We do not have rights to open our data to the public as it affects privacy. Therefore, those who provide data to us are the owners of the data. We generalise the data we open without affecting privacy issues. The owner of the data should open their data to entities and the public. The data originator can set policies of who and how they should use the data" (R30)*

Government organisations from the health industry show especial concern over data privacy and data ownership. Health information is not classified and structured to suit the usability and computability of open data. The data privacy that protects an individual's health information is not regulated at the national level. Additionally, international standards that define data ownership within the health industry are questioned. A senior manager in the health industry stated:

> *"The regulator has to define data that are similar to health. Unfortunately, in the health sector, no international laws or regulations state who is the owner of the data, for example, if we are looking at a patient's file, who owns that data? Is it the IT department? Is it the Ministry of Health? Or is it the patient? We have an issue about ownership of data and privacy!*" *(R04)*

This lack of data ownership act at the national level affects the OGD initiative and raises the level of resistance to openness. The absence of data ownership regulations was agreed on among government organisations, while the lack of guidelines and procedures moves the burden on to the decision makers and higher management, where every data set published requires authorisation. A senior advisor stated:

> *"We do not have ownership law, and we do not have any guidelines in the Ministry, it is only what HE the Minister decides to open. Definitely, this is affecting us in opening our data" (R23)*

The demand for a comprehensive data ownership law is an essential factor for the OGD

initiative to progress. The data analysed emphasised that the macro-level view of data ownership is aligned with different organisations' views. The IT regulator acknowledged that the owner of the data is its initiator. However, at the same time, the IT regulator emphasised the need for a well-defined data ownership law and privacy act for the data to be publicly open. A deputy CEO of the IT regulator stated:

> *"The generator of the data is supposed to be the owner of the data if it is the only source of information. We have to clarify who is owning what, where the boundaries start, for example, does the organisation have the right to stop sharing this data? Who owns what? How should the redundant information you can find with the Ministry of Health and the civil status records be dealt with? Do they have the right to publish this information? I do not know, privacy is probably an issue. The question is the reality of what to publish. We need a privacy law" (R12)*

Similarly, at the macro-level, the data regulator acknowledged that there is a need for a data policy to be established at the national level. A senior IT manager stated:

> *"We need a data policy to articulate which data is owned by which organisation" (R07)*

The need for data ownership governance and supporting regulations such as a privacy act at the macro- and micro-levels is acknowledged. However, regulators at the macro-level at the same time argue that privacy and data ownership are not entirely neglected. Other regulations cover the privacy aspect, such as the data strategy and electronic transactions laws. Despite the fact that the Data regulator initiated the data strategy at the national level, the strategy has not yet been approved and finalised. A CEO from the Data regulator stated:

> *"Data strategy is imperative. Do you know why? Because it is going to identify the roles and responsibilities of the government entities regarding generating and ownership of the data, and whether this data is shareable or not. Whether data is confidential or not. Data strategy will keep things clear unlike now" (R13)*

The data strategy largely refers to data ownership, although the document does not explicitly cover data ownership classifications or governance. While there are specific laws that protect individual privacy in electronic transactions such as royal decree 69/2008 (Official Gazette, 2008), there are no explicit laws regulating data privacy at the national level. No one responsible for initiating such a law has been identified, and organisations are unable to legitimise the ownership of their data. The uncertainty is largely due to the mixed roles and

responsibilities of the IT and Data regulators. To clarify the situation, one respondent argued that the ownership of data should be the responsibility of the Data regulator, with rights to publish the data:

> *"There is no push from the Council of Ministers, nor the IT regulator. No one says "this data is owned by this Ministry". The final hub of owning all the data should be assigned to the Data regulator. The data ownership aspect is that there is no clear definition of who owns what data in Oman. Ownership is not just an issue of open data; it is all data-related aspects in Oman which should be clarified" (R16)*

The logic of owning the data and controlling its dissemination represents a rival institutional practice at the micro-level. However, the macro-level view points in the opposite direction to elevate the conflicting logic by promoting the logic of transparency and easing the ownership and control logic of a different organisation.

5.2.4 Institutional Capabilities Logic

Institutional Capabilities Logic (ICL) is defined in this study as *the interpretation of practices of different challenges within the institutional environment that represent a gap in capabilities among organisations, where the gap is present in three capabilities, Human Capital, Technology and Organisational Capabilities, to adopt the OGD.* ICL is illustrated in Figure 5.6.

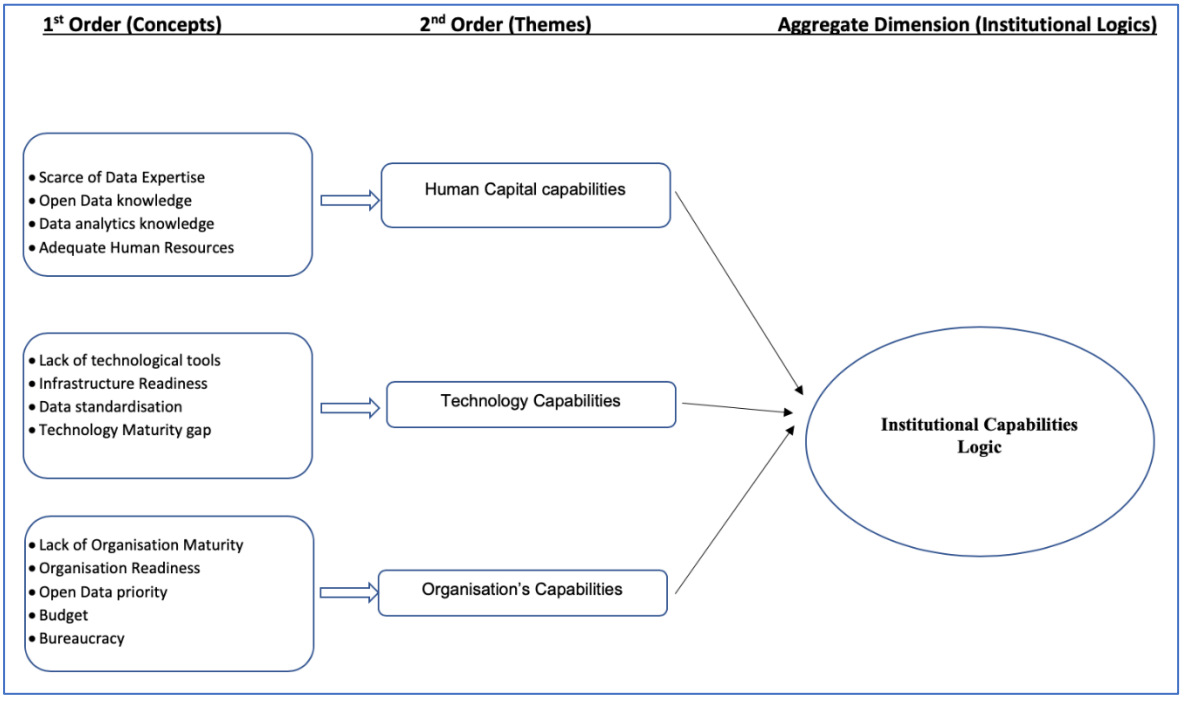

Figure 5.6 Institutional Capabilities Logic

Table 5.5 illustrates the institutional practices and themes that formulate Institutional capabilities Logic(ICL).

Table 5.5 Institutional practices and observations formulating Institutional Capabilities Logic

Theme	Institutional Practices and observations
Human Capital Capabilities	• Lack of data expertise in the institutional environment • Open data knowledge is not present • Organisations experience a lack of data analytics knowledge • Lack of skilled human resources at the organisations
Technology Capabilities	• Improper use of technological tools related to open data • Infrastructure Readiness to support open data is questionable • Data standardisation and data classifications are not present • The presence of different technical levels between organisations at the micro-level
Organisation's Capabilities	• Different organisations capabilities level • Lack of organisations readiness • Financial constraints • Bureaucracy

5.2.4.1 Human Capital Capabilities

The human capital capabilities theme is related to the practice of why and how organisations within the institutional environment are not able to open their data to the public. This inability is associated with the organisational capabilities of harnessing knowledgeable expertise in the field of open data. The data analysed illustrates the gap between organisations from the perspective of the availability of knowledgeable human resources in open data.

Several respondents highlighted these disparities. Organisations lack advanced analytical capabilities because there are few data experts in the region. A manager in the statistics department claimed that they require more advanced analytics capabilities. The scarcity of experts in the region is a pressing issue for the OGD; a senior manager of the IT regulator stated:

> *"We need experts in analysing the data, the expertise in advanced analytics is an issue in the ministry and region" (R01)*

Although some organisations have data analysts, their lack of specific business expertise hinders the organisations from extracting the right knowledge from the data for the public. Therefore, several organisations tend not to open their data or even to share it internally. A senior respondent from the statistics department stated:

> *"We are trying to present the data in a way that allows the Planning Department to have in-depth analysis, but this is not knowledge. We are looking to extract knowledge and that is what we miss" (R02)*

Another aspect of the shortage of human resources is related to specialisation, as in the health industry. The Data regulator relies on the descriptive aspect of data rather than inferential analysis, again linked to the scarcity of specialised human resources in data presentation related to a specific sector. A senior manager argued that the Data regulator lacks health data specialists:

> *"The Data regulator mainly relies on descriptive and the inferential part of the statistics, so when you talk about the specialised sectors like health, it is tough for them to handle it. When it comes to the health data, the Data regulator does not have an epidemiologist specialist, demographers, etc. They have to consult the respective ministries because they need to understand the nature of these data" (R25)*

The regulators at the macro-level are not able to collaborate with different organisations within the institutional environment, because of the knowledge gap between the organisations and regulators. The communication gap is related to the government organisations' ability in providing professional staff who can coordinate and communicate effectively with the regulators. The gaps hinder the regulators from acquiring the appropriate data from the organisations. An IT specialist looking after the Data regulator's portal stated:

> *"We are now shifting to the web services, but some of the organisations have said that they do not have enough knowledgeable staff to use them. They do not even have the knowledge of simple tools such as API" (R15)*

Moreover, the data regulator revealed that the issue not only concerns government organisations, but extends to the regulatory authority's capability to attract suitable expertise in the field of information technology and open data. An IT manager in one of the regulatory

authorities acknowledged this issue:

> *"We have a problem in people, in technicians, technology itself. Technology also needs experts because we are just newly established and we have a shortage of staff, and all the staff here are fresh graduates with very short experience, a maximum of five years. We have a lack of expertise for the big data and open data" (R07)*

The IT regulator cannot provide appropriate support to the organisations which need specialised data experts. The differences in human capital capabilities between organisations widens the gap in collaboration between the regulators and government organisations. The issue was highlighted by the Deputy CEO of the IT regulator who stated:

> *"Our challenge is on capacity, people and knowledge. We do not have experts to do it" (R12)*

Despite the lack of expertise in open data in the institutional environment, organisations utilise the current internal human resources and capacities. Another approach is to gain knowledge and build expertise through learning. This was highlighted by one government organisation that has initiated an internal open data project. The organisation's culture aims to be a pioneer within the institutional environment for open data, as illustrated in the earlier section. Their project stated:

> *"We have internal resources only, and they are good, and we rely on them" (R20)*

The acknowledgement of scarce human resources with data expertise in multiple organisations is a competing logic in the institutional environment, although the gap is reflected in different organisations according to the organisation's size, its maturity and its culture.

5.2.4.2 Technology Capabilities

Technology capabilities are essential in facilitating data openness to the public. The technology capabilities here are related to disparities in technical strength between organisations in the institutional environment. An IT specialist interviewee stated:

> *"Technology is one of the aspects we have. Many organisations are not ready for this. We do have the tools in our organisation; however, other organisations do not!! They still do not have online applications or even mobile applications, so how are we going to request data from them if they cannot provide it!!! It is a big technical*

> *issue, as some organisations have old technologies and it is difficult to get data and establish links and integration to the legacy platforms" (R18)*

The technological capabilities vary between government organisations, where some are well advanced and others are using old systems that are incompatible, preventing integration for open-linked data. The variation in the level of technological capacities has multiple facets, including the lack of relevant information systems and data extraction tools, contributing to the maturity gap:

> *"From a technical perspective, some of the government organisations do not have a system that is compatible with ours. Unfortunately, how to use this data is still an issue from a technical perspective. We are facing it as a challenge because all the data is available for organisations but how to use it on their platform is not yet implemented in the right way. From a technical perspective, the IT regulator is ahead of other governmental entities" (R16)*

Another facet is the presentation of open data to the public. Although organisations opening their data, the data published is not presented in accordance with the open data standards and principles. The data is presented using simple analytic tools and techniques because of the lack of advanced tools and expertise.

> *"We do not have advanced analytical capabilities for the data right now; we use simple reports and SPSS analysis tool" (R22)*

This argument implies the need for a unified data structure that allows organisations to communicate and link the data appropriately. Unified structure and classification of the data, as illustrated in the earlier section allows the organisations to make use of the open data and gain value. A senior IT director interviewed emphasised this:

> *"The structure of the data from the technical perspective is an issue, as the unified data classification links all the data" (R03)*

The view of the Data regulator is that there is a maturity gap regarding the technology capabilities between organisations in the institutional environment. The gap in technological capabilities hinders the adoption of open data at the national level. A CEO of the Data regulator asserted:

> *"The organisations need some tools because they are well behind and did not give attention to things as they were running their entity without technology and tools and it was going fine. There is a huge gap in technology, as we have databases that do not talk to each other, each database is built differently" (R13)*

In contrast, some organisations that are well advanced and driven by technology claim that technological capabilities are not an issue. A senior manager argued that they are well ahead of other organisations as they have been using technology over a long period. An IT manager commented:

> *"We started computerisation in the late 90s, but now people are demanding more technologies" (R04)*

This suggests that an organisation's technological maturity is affected by how the organisation was driven by technology as a necessary requirement in their operations. The need for a stable structure and continuity also drives the level of technological maturity. Even in organisations which are technologically well advanced, other factors may prevent them from operating efficiently. Infrastructure readiness, for example, may limit them in consolidating the data and presenting it to the public in an appropriate format. The network infrastructure and reliable connectivity are issues within the institutional environment. A senior manager within the same organisation claimed that they are unable to connect to remote systems and data due to the connectivity issue, and a senior manager in the health industry commented:

> *"Why could we not link our medical records from remote areas? ... Because the connectivity is very low in terms of Internet and sometimes also the development of software itself is not in good condition" (R25)*

The country's geographic terrain obstructs the connectivity of organisations in remote areas. Several organisations are not connected to the national unified government network, which affects the linking of their data. A senior respondent stated:

> *"The key challenge is the infrastructure; we have several numbers of organisations which are not on the government network. Therefore, sharing the database from those organisations is a manual and offline approach which takes a long time" (R04)*

There are different views about infrastructure readiness within both the institutional environment and between organisations. An IT manager stated:

> *"Infrastructure is not as big a challenging as it was. We have centralised databases, and we have more than 18 government organisations integrated with us, so infrastructure is not an issue" (R01)*

However, an argument in the same organisation suggests that the infrastructure remains an issue for open data at both national and organisational levels. An IT specialist commented:

> *"Infrastructure* is *not ready!!! as a ministry is not ready yet. This is a big challenge" (R18)*

Similarly, a senior advisor in the same organisation asserted:

> *"We have more infrastructure issues than anything else" (R23)*

In contrast to the organisations' varying views on infrastructure readiness, the IT regulator argues that the infrastructure supports the open data initiative. An open data specialist from the IT regulator authority stated:

> *"I think infrastructure, as it is now, is very much ready to share anything within the government domain" (R09)*

The organisations driven by technical professionalism, such as the IT regulator, argue that technology is well defined at the national level. However, the technology divide has been widened between organisations as they sense that the IT regulator management does not acknowledge the problem. An open data specialist in the IT regulatory authority asserted:

> *"Yes, we do have the capabilities in Oman, the technology is not an issue" (R09)*

However, the Data regulator has a different opinion of infrastructure readiness at the national level. An IT specialist at the Data regulator stated:

> *"One of the challenges is infrastructure issues, that is one of the problems" (R15)*

Different opinions about the infrastructure's readiness in the institutional environment are based on a currently evolving project to improve the infrastructure. Therefore, the benefits have not yet been realised at any level, whether national or organisational.

The technological capabilities detailed above contributed to the widening gap between organisations' technical abilities, affecting their data openness.

5.2.4.3 Organisational Capabilities

Organisational capability is another facet of ICL which covers their ability to open their data from perspectives other than technology. One is their ability to align and keep pace with the new technology of the regulators. Several arguments stress the inability to achieve and sustain the knowledge level of open data with regulators and peer organisations. A senior manager asserted that the pace of IT, pressured by the IT regulator, is increasing faster than the organisation's capabilities:

> *"IT regulator is moving faster than the government entities, especially with the data. IT regulator is much in advance in its role as planner ... there is a gap, we need to improve it" (R03)*

Similarly, a senior advisor said:

> *"The issue is that technology is moving faster, and we need to catch up with it" (R23)*

There is a clear consensus among respondents that there are different levels of capabilities between organisations. However, they acknowledge from the need to raise the level of organisational capabilities through the intervention of the regulators. An open data project manager in one of the organisations proposed that the differences could be eased with the assistance of the IT regulator:

> *"There is a gap!, but with IT regulator support, we should have the capacity" (R20)*

Another IT respondent highlighted the need to establish the right resources to enable organisational readiness, prior to developing a strategic plan concerning open data:

> *"There is a gap in maturity and resources, and I do not mean people, I mean the overall resources which were supposed to be established before putting this strategic plan" (R06)*

Valuing the importance of the data is another issue contributing to different levels of organisational capabilities. It implies experience in how to utilise the data within the organisation's culture. A senior manager said:

> *"I think we are providing systems that can be used, where users can use lots of information from the system, where they can benefit from the data. However, I think they are not capable of using these data, or even not mature enough to see the importance of the information they have in the system" (R03)*

Linking this issue to institutional change is another aspect, where a senior IT manager stated:

> *"It will bring change of course, I think the ministry is not ready yet for that change, they need to understand the importance of open data and how they can use it and how it will change their practices, and then they can take decisions" (R03)*

The opposite argument, that the lack of a supportive environment contributes to the differences in capability levels of organisations, was proposed by a senior manager:

> "*I think it is not the technology maturity. It is the availability of supporting environment" (R25)*

The supportive environment includes support from the regulators. An IT manager argued that the regulator assumes all the organisations are at the same maturity level:

> *"The IT regulator thinks that organisations are at their maturity level and expect them to be at the same level. That is contradicting with the real life of the organisation."*

The macro-level opinion in this regard is clear and concise, as the Data regulator acknowledges the maturity issue:

> *"Let us say all those entities in Oman are in line together? I will say, No. There are a lot of differences between the entities. There are significant gaps. This is maybe the issue" (R13)*

Moreover, the Data regulator acknowledges the need for change to meet the required deadline for advancing organisational capabilities to an acceptable level. A data regulator CEO added:

> *"I think for the open data to come to live, the entity should be ready, and this will need time, and it needs for some of them who are behind to move to the electronic way" (R13)*

The organisational capabilities detailed above contributed to the ICL gap observed between organisations, affecting data openness from a non-technical perspective.

5.3 Summary

Overall, the findings revealed one dominant and three competing institutional logics in the phenomena studied. The identified institutional logics rely on five principles (Thornton *et al.*, 2012). *Institutional Acceptance Logic (IAL)* is the dominant institutional logic for adopting open data at the national level, although different motivations and drivers indicate different intentions in the institutional environment. Following the worldwide open data movement to gain social and economic value from the data is one of the main motives dominating the institutional environment at multiple levels, and the findings showed a readier acceptance of data openness at the micro- and macro-levels.

However, several competing logics persist in the institutional environment that conflict with the dominant institutional logic, hindering the OGD initiative from achieving its objectives. These competing logics are *Institutional Roles Logic (IRL)*, *Ownership and Control Logic (OCL)* and *Institutional Capabilities Logic (ICL).* IRL concentrates on the various institutional structures to support the open data initiative, and the roles and responsibilities of organisations at the macro- and micro-levels of the institutional environment. The institutional roles are affected by the strategic directions of the OGD initiative at the macro-level, where a clear road map, strategy and common objective have not been determined. Moreover, the power and authority conflict of regulatory authorities is a vital element in the institutional environment, hindering the adoption of open data. IRL also shows a disconnect in laws and regulations where the foundations of the regulative elements are not fully established in the developing country. The differences in management styles and approaches in dealing with the initiative disrupted the path line of the adoption and decoupled the *means* and *end*.

The ideation to translate the meaning of various institutional practices is bounded by OCL. The ownership is not only related to the data ownership dilemma but extends to the resistance to data openness to avoid public or peer criticism of the data published. Organisations at the micro-level are also concerned about the loss of privileges obtained from the data.

The third competing logic, ICL, focuses on the presence of various capabilities in the institutional environment. A gap was identified in the availability of the right human resources and advanced technological aspects, although the capabilities vary in accordance with the organisation's size, professionalism and maturity.

Chapter 6 : Discussion

6.1 Introduction

The aim of this research is to explore and understand how the institutional logics at the early stage affect adoption of the OGD initiative at the national level. The research contextualises the phenomena from the OGD initiative in Oman's public sector as a case study. The institutional logics are qualitatively captured using techniques suggested by Reay and Jones (2016) and supplemented by the three-tiered methodology of Gioia *et al.* (2013) to achieve qualitative rigour. The findings of this study provide an in-depth illustration of how different institutional logics interact with institutional pillars, showing that the interplay of institutional pillars has relative effects on the institutional logics. The relative effects presented in the institutional environment are in the form of different weights of influence and pressures. Furthermore, the findings show that this interplay affects both macro- and micro-levels of the institutional environment. The research underlines the fact that studying both institutional logics and institutional pillars simultaneously is essential to understanding the effect from the holistic view. The study also addresses how the institutional pillars shape the institutional logics from the institutional change perspective. Finally, this research suggests a conceptual framework for OGD adoption at an early stage, from the institutional perspective.

The case study selected is an embedded single-case design (Yin, 2014), where the context is the national level with embedded multiple units of analysis. The OGD at the national level comprises multiple government organisations that together form the institutional environment. This thesis covers the discussion of multiple sources of evidence from nine government organisations involved in the OGD initiative. Following the suggestion by Yin (2014) for research design components, this chapter presents the logic for linking the data to the propositions and setting the criteria for interpreting the findings through the lens of the theory selected (Chapter 3). Therefore, the chapter themes are materialised from the findings and linked to the institutional logics perspective and institutional pillars.

This chapter discusses the findings presented in the previous chapter and addresses the institutional logics that affect the adoption of the OGD initiative in developing countries. It is structured to present an explanatory theme that addresses the research question and sub-questions identified in chapter 1:

How do institutional logics affect the emergence and adoption of the Open Government Data Initiative in the public sector?

- How do the institutional pillars affect OGD in the institutional environment?
- How do the institutional logics affect the OGD?
- How does the interplay of micro- and macro-levels affect the OGD initiative in the public sector?

The chapter consist of six sections including the introduction. Section 7.2 presents a revised conceptual framework for the OGD adoption. Section 7.3 shed light on institutional pillars in the institutional environment of the OGD initiative. Section 7.4 discusses different institutional logics that enable/constrain OGD adoption, reviewed in the literature from different perspectives. Section 7.5 presents and discusses other institutional perspectives that shape the institutional logics derived from the case study. Finally, section 7.6 summaries the chapter.

The initial conceptual framework, as illustrated in Figure 6.1, was proposed in Chapter 3 to conceptualise how the institutional logics affect the institutional practices in the institutional environment.

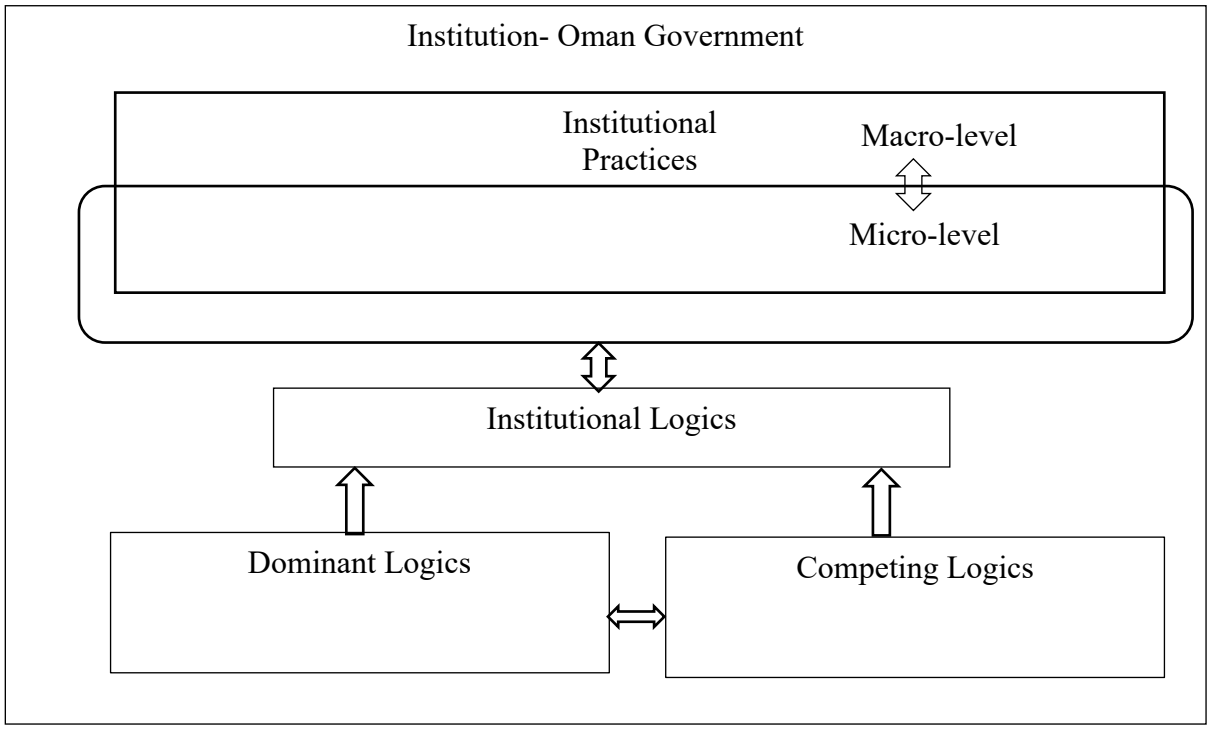

Figure 6.1 Initial Conceptual Framework for OGD Initiative

The next section revisits the conceptual framework proposed and outlines how the institutional logics shape the behaviours of actors in the OGD institutional environment to reflect the interplay between different elements of the conceptual framework.

6.2 Revised Conceptual Framework of Open Government Data Initiative

The initial conceptual framework addressed in Chapter 3 (Fig 6.1) explains how and why the ideations of different logics shape the meaning of institutional practices where the institutional logics operate at multiple levels and link the macro- and micro-levels. It recognises the overlap of co-existing dominant and competing logics and their effect on institutional practices (Hayes *et al.*, 2014).

Revisiting the conceptual framework in light of the findings, this research shows that with the overlap of logics, the institutional pillars affect the institutional logics. Moreover, this research shows that there is an interplay between the institutional pillars and competing logics that shapes the institutional practices. Figure 6.2 presents the revised conceptual framework for the OGD in the early stage of adoption.

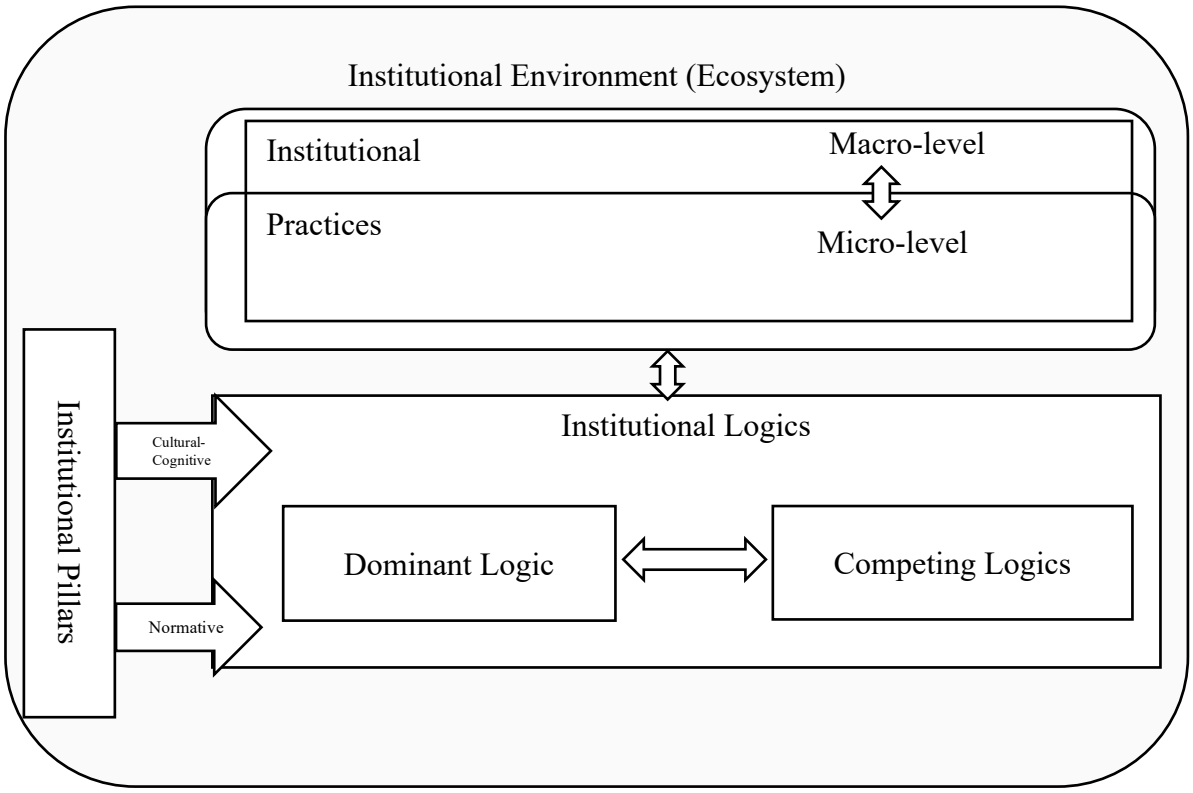

Figure 6.2 Revised Conceptual Framework for Open Government Data Initiative

In presenting the revised conceptual framework, the following sub-sections address the framework inductively: first, to discuss the interplay between institutional pillars and institutional logics; and secondly, to discuss the interplay of dominant and competing institutional logics between micro- and macro-levels.

6.2.1 The Interplay of Institutional Logics

The research has identified one dominant institutional logic and three competing logics in the OGD initiative. The identification of logics entails the past and present social interactions of different social actors at macro-level and micro-level. The interplay between logics explains the different interactions in the studied phenomena of OGD initiative. This research sets out that the dominant and competing logics co-exist in an imbrication where they co-instituted in the institutional environment. This pattern represents the interplay of the dominant and competing logics that frames the institutional practices in the OGD institutional environment.

The interplay in the institutional environment represents a single ecosystem with different relationships through space and time that embrace institutional complexities, as illustrated in Figure 6.2. The interplay of institutional logics and institutional practices is recursive, where the logic affects the institutional environment of the OGD. The dominant logic accelerates the adoption and influence of different actors at the macro-level and micro-level. Simultaneously, the competing logics influence the OGD initiative in the opposite direction, creating an imbalance and leading to conflict within the institutional environment at the micro-level. However, the reaction at the macro-level affects the micro-level through the mechanism of institutional change and institutional trust, to ease the resistance.

The institutional environment lacks the essential foundation of laws and regulations, preventing the dominant logic from being fully institutionalised; thus, the regulative pillar is less-prominent and the cultural-cognitive and normative pillar is actively prominent. Addressing the interplay from the bottom-up, this research concludes that the institutional pillar affects the institutional logics, shaping the ideation and meaning of different actors. The rationale for the different behaviours of actors at the macro-level and micro-level reflects the practices in the institutional environment. The interplay contradicts the argument of Klecun *et al.* (2019) that institutional logic influences the stakeholders' behaviours and generates institutional pillars.

The institutional logics co-exist despite the tension and conflict between them. Moreover, the dominant logic reacts with the competing logics to create balances of ideation and meaning that shape the behaviours of different actors at the micro- and macro-levels. However, the competing logic reinforces the logic that hinders the OGD initiative, consequently affecting its adoption. Managing different logics introduces complexities to the institutional environment; however, the competing logics are not susceptible to change.

6.2.2 Interplay of Institutional Pillars

The interplay of institutional pillars in the OGD institutional environment shows different weights of influences. It ensures the regulative pillar has relatively insignificant effects, while the normative and cultural-cognitive pillars are prominent. The regulative pillar remain comparatively insignificant under different levels of influence. Moreover, there are different sources of conflicting coercive pressure in the institutional environment. However, the effect of the coercive pressure is minimal where the interplay of the regulative pillar disturbs the balance of the OGD initiative.

The normative and cultural-cognitive pillar have a relative effect on OGD adoption. However, there is interaction between the normative and cultural-cognitive pillar, through the mimicking mechanism, while the interaction between coercive and normative pillar and between regulative and cultural-cognitive pressure is less significant. Moreover, the normative and cultural-cognitive pillar is sufficient to influence the dominant logic (IAL). The normative and cultural-cognitive logics frame the dominant logic with incremental change that eases resistance to OGD adoption at the micro-level. Addressing OGD adoption from the perspective of the ecosystem, the incremental change requires institutional trust. Regulators in the institutional environment must re-establish institutional trust between the micro-level and macro-level, as a result of past experience that affects the trust between organisations and regulators. Therefore, this study shows that institutional trust is contextualised in the time and space perspective. This research also shows that normative and culture-cognitive pillars interact recursively to shape and influence dominant logics in the institutional environment, as depicted in Figure 6.3.

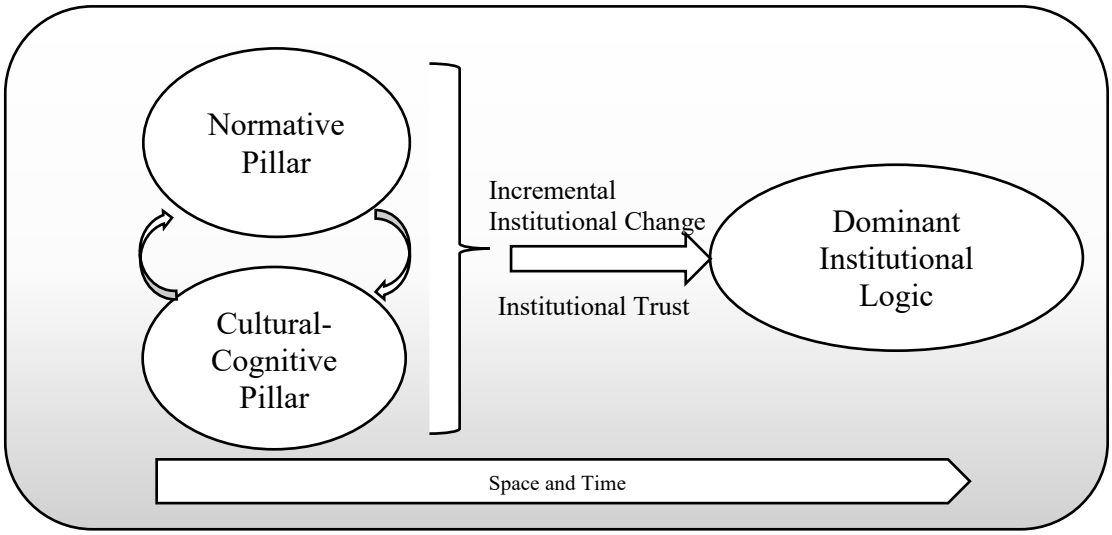

Figure 6.3 Interplay of Normative and Cultural-Cognitive Pillars

Revisiting the diagram proposed in Chapter 3, the researcher concludes that the normative and cultural-cognitive institutional pillars have a prominent affect, internally and externally, on the OGD initiative, where the regulative element exerts less pressure. The revised interplay is illustrated in Figure 6.4.

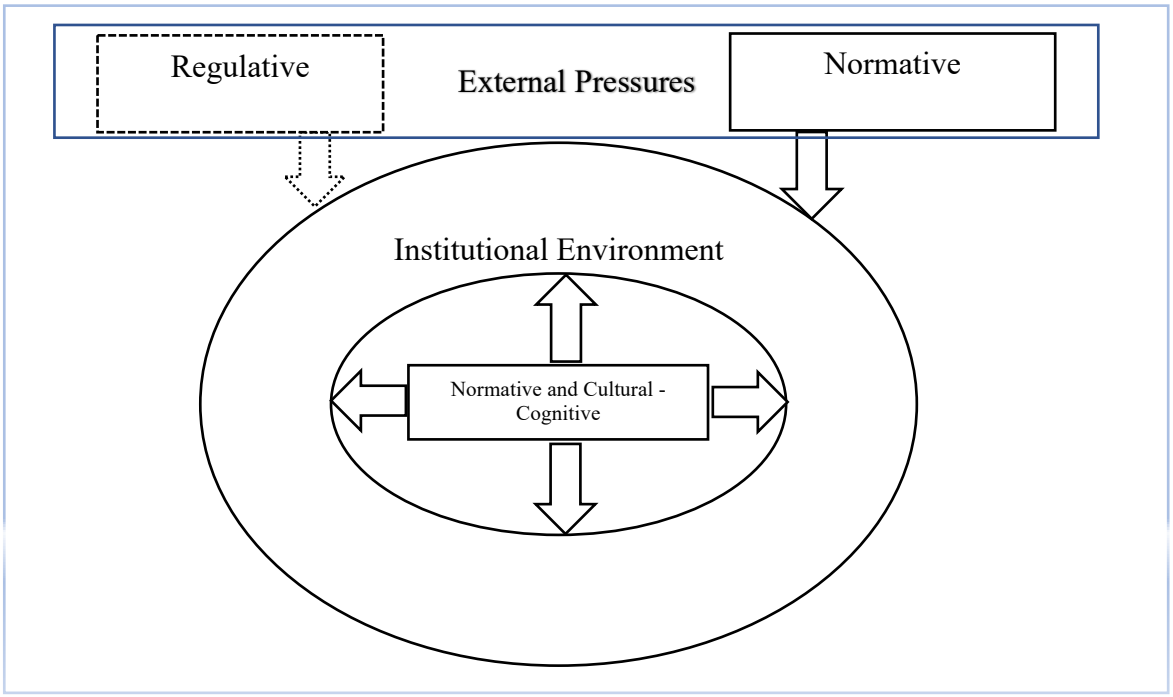

Figure 6.4 The prominent Institutional Pillars in the OGD initiative – (Adapted from (Scott, 2014, 2011))

In order to present a structured theme, this chapter addresses the sub-research questions to answer the overarching research question. The next section presents an explanation for the first sub-research question that queries the institutional pillars that enable or constrain OGD. It addresses the institutional pillar found in the institutional environment, as it is important to understand them from the beginning so that the institutional logics can be clearly understood

at the later stage. The next section discusses how the institutional pillar affect OGD adoption, and how they and institutional logics interact.

6.3 The Effects of Institutional Pillars on OGD Adoption

The interplay of the institutional pillars on the regulative, normative and cultural-cognitive pillars has various effects on the adoption of the OGD initiative at the national level. The normative and cultural-cognitive pillars have a prominent effect than regulative pillar. Based on Scott (2011, p. 60) and DiMaggio and Powell (1991) seminal work on isomorphism, this study contextualises the institutional pillars by introducing indicators relative to OGD. Table 6.1 illustrates how the institutional pillars are enacted to attain legitimacy by the indicators derived from the findings.

Table 6.1 Institutional Pillars in the Open Government Data Institutional Environment (Adapted from Scott, 2011 and DiMaggio and Powell (1991))

Open Government Data Institutional Environment	**Regulative**	**Normative**	**Cultural-cognitive**
Basis of compliance, order and logic (why do we comply?)	Coercive expedience to laws and international agencies	Social obligation by the regulator's professionalism and public demand for transparent government	Taken-for-granted and shared-understanding to public and citizen value Mimetic efforts following the open data global movement
Mechanism (how does it work?)	Coercive	Normative	Mimetic
Basis of legitimacy (why is it approved?)	Government legitimacy	Morally governed	Culturally supported
Indicators (where do we see it?)	1. Government directives & incentives 2. Mandate from international organisations, e.g. UN	1.Professionalism of regulators 2. Public demand 3. Peer success 4. Affiliation with international organisations	Common beliefs and shared logics of actions for the objectives of efficiency, value creation, public engagement, transparency

The next sections discuss how each institutional pillar influences the OGD initiative in the early stage of adoption.

6.3.1 The Regulative Influences of OGD adoption

Studies suggest that the three institutional pillars have similar effects in adopting information systems initiatives (Hossain and Chan, 2015; Alzadjali and Elbanna, 2019). However, this research shows that the coercive pressure of the regulative pillar is less-prominent in OGD adoption, and has the least influence in the institutional environment. The sources of coercive pressure identified are external from international organisations and internal from the regulatory authorities. Both affect OGD adoption but are not completely institutionalised, which causes instability as illustrated in Figure 6.5.

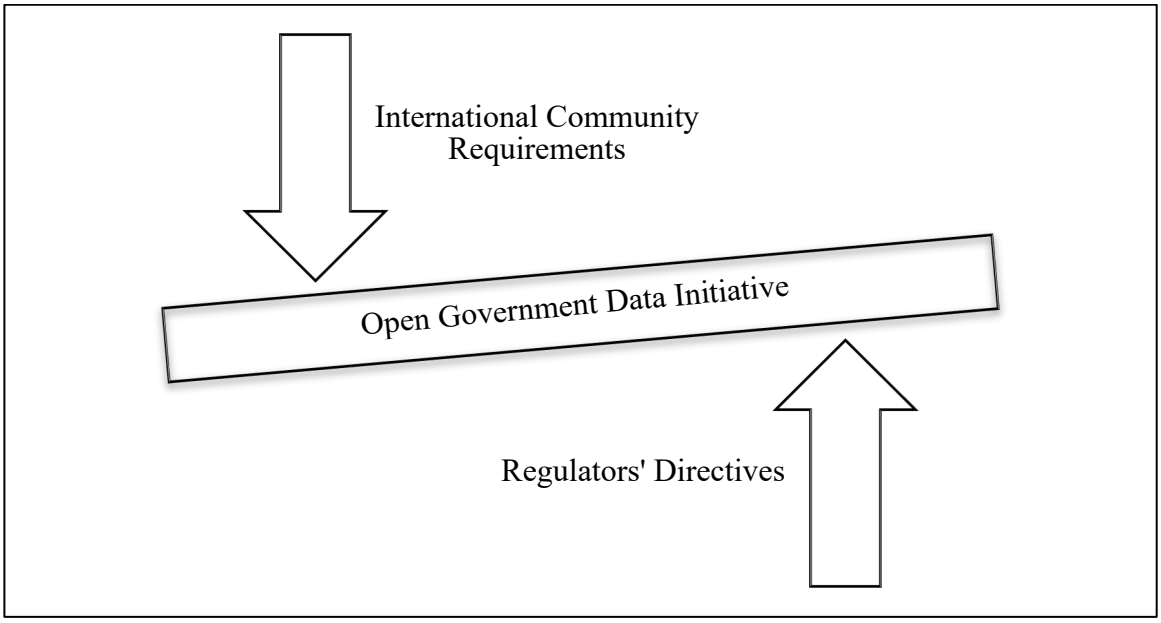

Figure 6.5 Interplay of Coercive Pressure

The first source of coercive pressure, from international organisations[9] , is less-prominent in the OGD adoption. International organisations exert coercive pressure on a country to implement transparency measures, and the consequences of not adhering to their requirements may have a negative impact in the international community on the country's reputation, politically and economically. Thus, the Omani government showed compliance in the initial stage by inaugurating the OGD initiative in 2013, as a key response to the pressure. However, the OGD adoption has not achieved the desired objective at the later stages, which present a short-term result.

[9] Like United Nations

These findings are aligned with the study by Shkabatur and Peled (2016) five developing countries subject to external pressure from international organisations. They suggest that international organisations focus on short-term results in implementing OGD. As a result, the adoption of OGD by many developing countries is no more than ceremonial. However, this research shows that the external coercive pressure at the early stage has a temporary influence on OGD adoption and does not affect the conflicting logics. That is, Oman follows the trend towards new technology in order to satisfy external forces in proceeding further with the adoption. Moreover, the international community requires transparency in developing countries, in this case exerting external pressure for data openness. The literature supports these findings; a number of studies suggest that developing countries are prone to both external and internal coercive pressures to adopt open data (Altayar, 2018; Shkabatur and Peled, 2016).

However, following the trend to new technology does not complement other institutional pillars to progress and sustain the OGD adoption, as technology adoption progresses over a longer period of time when there is a high level of uncertainty in the institutional environment. This research shows that uncertainty in the environment is an antecedent to technology adoption in the context of OGD. Lanzolla and Suarez (2012) also found that technology diffusion follows the same pattern. Thus, the institutionalisation of OGD adoption progresses over a longer time period.

From the above discussion, this research concludes that the influence of international organisations is an additional source of external coercive pressure at the national level, whereas the Wang and Lo (2016) study suggests three sources of external coercive pressure i.e central government, local government and the public. Our methodology applies the analysis at the national rather than the local level. Moreover, the findings are related to Oman as a developing country, which might explain the contrast with developed countries.

The government mandate in the form of the IT and Data regulators' directives is the second source of coercive pressure. The directives originate at the macro-level to encourage government organisations at the micro-level to facilitate data openness. However, they imply non-conformity as the regulators at the macro-level lacks legal sanctions. Thus, the government organisations at the micro-level do not necessarily have to change (Palthe, 2014). The institutional change stems from the macro-level where it is not sustained by fear and coercion. Despite the lack of sanctioning mechanisms, the regulators drive OGD

adoption by reward and recognition, although only a few of the government organisations seek the recognition. That is, OGD adoption is not fully institutionalised at the micro-level because of the absence of sanctions mechanism, representing a legitimacy issue.

The empirical findings suggest a disconnection in conformity of the directives for structure and process that causes tension between macro- and micro-levels. This echoes the argument of Ashworth *et al.* (2007), that public organisations are prone to a disconnection between structure and process. The disconnection entails a decoupling between the directives and actual practices by government organisations (Meyer and Rowan, 1977; Bromley and Powell, 2012) which can be explained by a weaker competition between organisations in the public sector.

Although this research shows the existence of internal coercive pressures, the influence is not directly due to decoupling between practices and directives. Likewise, the finding is consistent with Davies (2018) empirical study of Victorian public healthcare information systems in Australia, which suggests a decoupling weakening coercive pressure due to uncertainty about the technology. The similarity is in relation to the complex nature of OGD and national health systems, although this research argues that the weaker coercive pressure is caused by political factors (González-Zapata and Heeks, 2017). Thus, government organisations are not eager to open their data publicly without other political considerations.

In the context of developing countries, this research outlines contradicts the findings by Altayar (2018) in a study of OGD in Saudi Arabia, in terms of regulative pillar. The contrasting findings reveal the differences in the institutional arrangements and organisational structures in developing countries. Moreover, Saudi Arabia is well institutionalised in terms of institutional arrangements and government structures, which are vital in enforcing coercive pressure.

The different weights placed on OGD adoption by external (international) coercive pressure and internal (regulators' mandate) coercive pressure affect the OGD initiative. Scott (2011) suggests that coercive pressure stems from sanctioning power or reward mechanisms to ensure proper behaviours in the public sector; however, the regulative pillar in this research is not empowered with any sanctioning mechanism to enforce the adoption coercively. Thus, this research shows that the coercive pressures are complex in nature and stem from different sources of influence that have different weights in OGD adoption.

Contrary to the findings of Alzadjali and Elbanna (2019) in the case of cloud computing in Oman, coercive pressure does not play a prominent role in the OGD initiative. Despite the same settings of government structure, these opposing findings between cloud computing as an eGovernment initiative and the OGD initiative stem from the political perspective as OGD introduces a new culture and norms. This argument is in line with Pyrozhenko (2017) study that suggests government openness introduces structural and cultural change which impedes the penetration of data openness in the government. From the empirical research, the finding disagrees with Hossain and Chan (2015) case study of an Australian open government initiative that shows that regulative/coercive institutional pillar has a positive impact on organisational adoption of open data. This disagreement reflects differences in the government organisational structure in terms of laws and regulations, where the sanctioning mechanism to enforce the adoption varies. Moreover, this confirms the differences between developed and developing countries' government structure and process.

From the above discussion, this research concludes that the regulative pillar is complex in nature and plays a less-prominent role in the early stage of OGD adoption at the national level. Moreover, different strengths of conflicting coercive pressure can exist in the institutional environment, although the impact on institutional change is minimal.

6.3.2 The Normative Influences of OGD Adoption

The normative pillar is relatively prominent in the institutional environment of the OGD initiative. This research suggests that normative pressures emanate from the professionalism of regulators, social public pressure, peer pressure and external normative pressure, as illustrated in Figure 6.6. Moreover, this research addresses the normative pillar through an ecosystem lens, following the research of Dawes *et al.* (2016) and Dawes and Helbig (2010) to include the non-professionalism aspect of normative pressure. This study shows that normative pillar affects OGD adoption and slows its progress. Additionally, the literature shows a gap in analysing the OGD initiative using institutional analysis through the lens of the normative pillar (Hossain and Chan, 2015; Yang and Wu, 2016; Altayar, 2018), so this research sheds light on its role and how the interplay of normative pillar between macro- and micro-levels affects the adoption.

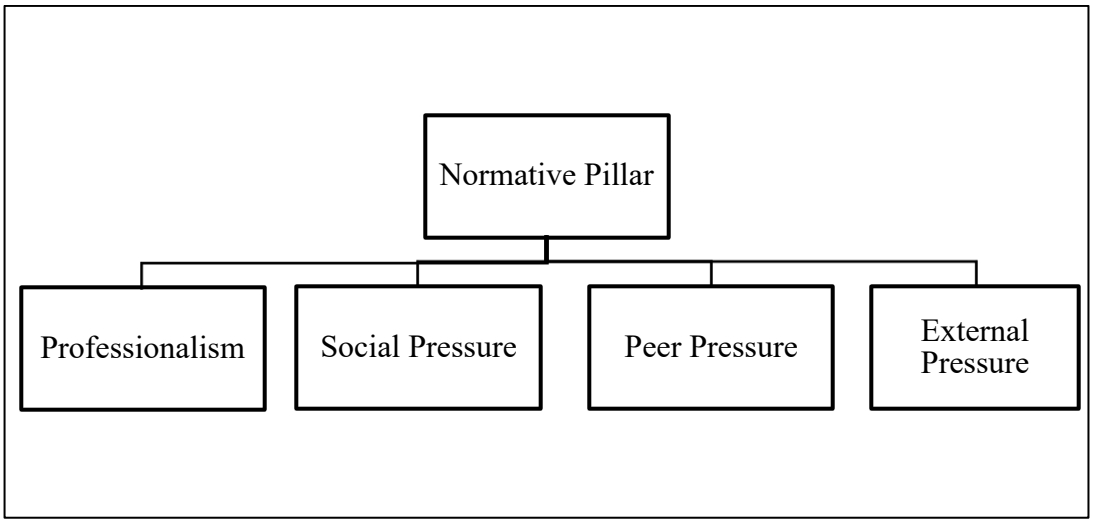

Figure 6.6 Normative Pillar Sources

Normative pressure puts a social obligation on the regulators and government organisations towards adoption of OGD. The social obligations are bounded by norms and values and governed by professionalism and the accreditation of regulators (DiMaggio and Powell, 1991; Llamas-Sanchez *et al.*, 2013). As suggested by Berger and Luckmann (1967), the professionalism of the regulators is the main source of normative pressure. This research concurs with these findings; however, other forms of normative pressure exist with equivalent weights of influence, such as social activities in the form of knowledge transfer sessions presented in training, workshops and national open data symposia (ITA, 2013; Muscat Daily, 2013; ITA, 2017a; NCSI, 2018).

The regulators impose their knowledge and professionalism in open data to ensure proper processes are enacted in the OGD initiative. Although in the context of this study the overlapping responsibilities of regulators' roles present a conflict between the IT and Data regulators, the research suggests that normative pillar sustains and drives the institutional change towards adoption. Likewise, Alzadjali and Elbanna (2019) case study of G-cloud computing in Oman suggests that normative pillar plays an important role in driving the change by challenging the professional regulator. The normative pressure from the regulator's professionalism is not taken for granted and requires close collaboration between stakeholders, as suggested by Zuiderwijk and Janssen (2014). Thus, a wider consensus from stakeholders to foster OGD adoption by government organisations is a vital element. Moreover, the co-existence of normative pressure from multiple professional regulators advances the OGD initiative. However, the adoption process is still slow pace requires longer for the institutionalisation process to be complete. This slower pace is a consequence of the knowledge and professional gap between regulators and government organisations.

Contextualising it to the open data discipline, this finding is consistent with Wen and Hwang (2019) who classified countries as developed or developing based on national characteristics. The lack of knowledge stems from the macro-level where realisation of the benefits of OGD to the society is not clear. Moreover, government organisations knowledgeable about open data adopt it in advance of other government organisations. The gap between government organisations is a digital divide that affect the overall adoption of the OGD initiative.

In addition to the normative pressure from professionalism, social pressure plays a significant role in OGD adoption. It arises in the institutional environment from the public demand for more transparent government. Historically, the Arab Spring uprising of 2011 (Bakri, 2011) resulted in the Omani government reacting to social pressure for political reform and greater transparency. Social pressure represents a normative pressure that stimulates government organisations to respond and open their data to the public. Thus, social pressure motivated government organisations to adopt OGD, despite the slow progress of institutionalisation.

The normative mechanism is driven by the norms in the institutional environment, therefore pressure encourages the adoption at the national level to reproduce normative institutions, as suggested by Scott (2011). The government organisations follow the institutional environment norms to participate and share data in order to become transparent public organisations. In the same manner, Kim *et al.* (2009) case study of the anti-corruption OPEN information system in Korea suggested that social pressure and citizens' demands for transparent open government apply normative pressure. Moreover, the practices by government organisations in the institutional environment imitate those organisations which have adopted data openness. Thus, social normative pressure leads to peer normative pressure, which changes the behaviour of organisations to follow the stream it is mimicking. Imitation is due to uncertainty in the institutional environment, in line with Scott (2011) research.

In addition to internal sources of normative pressure, external normative pressure co-exists in the institutional environment under different influences. The external normative pressure in the case of the OGD initiative emanates from the affiliation of the Data regulator with international organisations that offer professional advice. The literature focuses on the external pressure of OGD initiatives as a form of coercive pressure (Shkabatur and Peled, 2016; Wang and Lo, 2016), but this research suggests that external pressure also persists in the form of normative forces. The normative forces arise from the international organisations

and from regional competition that becomes a peer benchmark. The needs of developing countries stem from the external organisations' knowledge and professionalism in adopting new technologies such as OGD. El-Haddadeh *et al.* (2013) case study of Qatar electronic services revealed normative pressure from external organisations through knowledge and professionalism.

The historical aspect imposes negative normative pressures on the OGD initiative. The earlier perceptions and experience of the IT regulator by government organisations at the micro-level prevent the normative pressure from being completely institutionalised. As in Deephouse and Suchman (2008) study, the organisational reputation of the IT regulator affects the legitimacy of the regulatory authority. In order to regain the trust of the organisations at the micro-level, regulators are required to re-establish the institutional trust between the macro- and micro-levels (Bachmann and Inkpen, 2011). The re-establishment of this institutional trust requires adequate time and space.

Addressing the relationship between different institutional pillars, this research outlines an interplay between normative and cultural-cognitive pressures using the mimicking mechanism. However, interaction between coercive and normative pressure is less significant. The interplay between macro- and micro-levels in the institutional environment takes the form of institutional change (Davidson and Chismar, 2007), triggered by the normative pressure at the macro-level to ease resistance at the micro-level. Thus, the institutional change at the macro-level embraces institutional acceptance logics, which concurs with Hayes *et al.* (2014) study. However, the interaction is bounded by the institutional trust between macro- and micro-levels as depicted in Figure 6.7 (Ratnasingam, 2005).

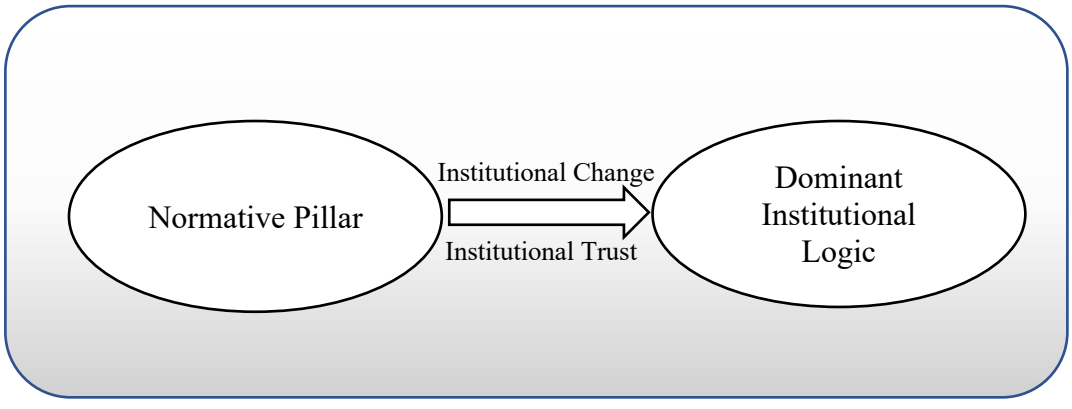

Figure 6.7 Interplay of Normative Pillar

To summarise, this research concludes that the normative pillar has a significant influence on advancing the OGD initiative, representing acceptable progress to the adoption by the regulators without the need for a de-institutionalisation stage. The normative pressure comes from different levels in the institutional environment. The social pressure from the public demand for openness becomes normative pressure for providing efficient and transparent government organisations. Developing countries are more enthusiastic to see the OGD initiative than developed countries, where openness tends to be the default (Hossain and Chan, 2015; Nugroho *et al.*, 2015).

6.3.3 The Cultural and Cognitive Influences of OGD Adoption

Like the normative pillar, the cultural-cognitive pillar is relatively prominent in the institutional environment of OGD. Capturing the cognitive frames, templates, or sets of collective meanings that shape the cultural-cognitive pillar in the institutional environment of OGD is challenging to recognise and reconcile (Scott, 2014, 2011). This research shows that the mimic mechanism also represents cultural-cognitive pressure where the shared belief and shared logic are dominated in the institutional environment.

The research findings revealed that government organisations respond differently to the OGD initiatives, with diverse attitudes to adoption. Government organisations who perceive the benefits of open data participated in the OGD initiative in the first phase. Consequently, these early adopters achieve legitimacy in the institutional environment. Others mimic the first-wave adopters only after extensive observation. This finding agrees with Alzadjali and Elbanna (2019) case study of G-Cloud adoption in Oman. The logic in following and mimicking the first-wave adopters implies a shared belief and embedded cultural materials (Hinings, 2012). Thus, the common shared belief about the OGD influences the organisational behaviour to mimic (Friedland and Alford, 1991; Thornton and Ocasio, 2008; Friedland, 2018).

The shared belief in OGD benefits was cognitively assumed and dominated by government organisations in the first phase. Thus, the mimicking mechanism suggests uncertainties and adherence to conformity with the norms in the institutional environment. Despite uncertainty, the new technology forces government organisations to mimic other organisations and adopt the OGD initiative to follow their success (Scott, 2014, 2011). In addition, the uncertainties lead the regulators at the macro-level to mimic other countries in the region.

The scarcity of technological knowledge in developing countries (Chen *et al.*, 2006; Wen and Hwang, 2019) is one of the reasons to mimic early-adopter countries. The mimicking reflects the bandwagon effect of new technologies, whereas developing countries seek to adopt a centralised structure to maintain control of the data openness (Canares and Shekhar, 2016). The finding concurs with the Canares and Shekhar (2016) study of five sub-national open data initiatives in developing countries. They argue that the decentralisation approach with missing national objectives is only possible with organisations with a high degree of strategic direction. However, the decentralised approach requires harmony between organisations and consistent adoption which is not present in Oman's OGD initiative. Thus, the first adopters at the micro-level aimed to establish an open data platform at the organisational level.

The shift from a centralised to a decentralised approach implies a change of strategic direction as a consequence of missing a national governance structure. Nevertheless, the sustainability of sub-national initiatives is at the risk of any new governance mechanism introduced at the national level, with the possibility of incompatibility and a negative impact on their initiatives. From the above discussion, this research shows that there is no common belief in streamlining governance mechanisms to adopt OGD.

Shared belief co-exists with the dominant and competing logic in the institutional environment of OGD, adding to institutional complexities (Leidner and Kayworth, 2006; Levitt and Scott, 2017). Thus, the research revealed that some government organisations are more comfortable with uncertainties and not mimicking the first-adopter organisations. Despite the cultural-cognitive pressure to mimic success (DiMaggio and Powell, 1991; Scott, 2011), this research shows non-mimicking institutional practices by government organisations in the form of cultural-cognitive. The institutional practice of non-mimicking represents a shared competing institutional logic over the dominant logic of acceptance. Competing logics emerge from shared beliefs, common perceptions and ideation about the OGD adoption. The ideation is based on the arguments of different competing institutional logics that comprise institutional roles logic, ownership and control logic and institutional capabilities logic. Accordingly, the contrary ideations of logics constrain OGD adoption and cause tension between the micro- and macro-levels. OGD adoption progresses more slowly than anticipated by the regulators, particularly as a result of the cultural-cognitive pillar and a missing regulative pillar that requires extensive time and effort.

In summary, the cultural-cognitive pillar in the institutional environment influences the institutional acceptance logic as depicted in Figure 6.8. Moreover, due to institutional complexity and the demand for robust institutional systems (Scott, 2014; Levitt and Scott, 2017), this research concludes that the normative and culture-cognitive pillars interact recursively to shape and influence dominant institutional logics. The interplay of cultural-cognitive pressure and OGD adoption at an early stage may hinder or advance the adoption. The influence varies based on the common beliefs in the institutional environment that shape the institutional practices and behaviours cognitively. Likewise, the cognitive belief variations across the institutional environment hinder the successful adoption of OGD at the national level.

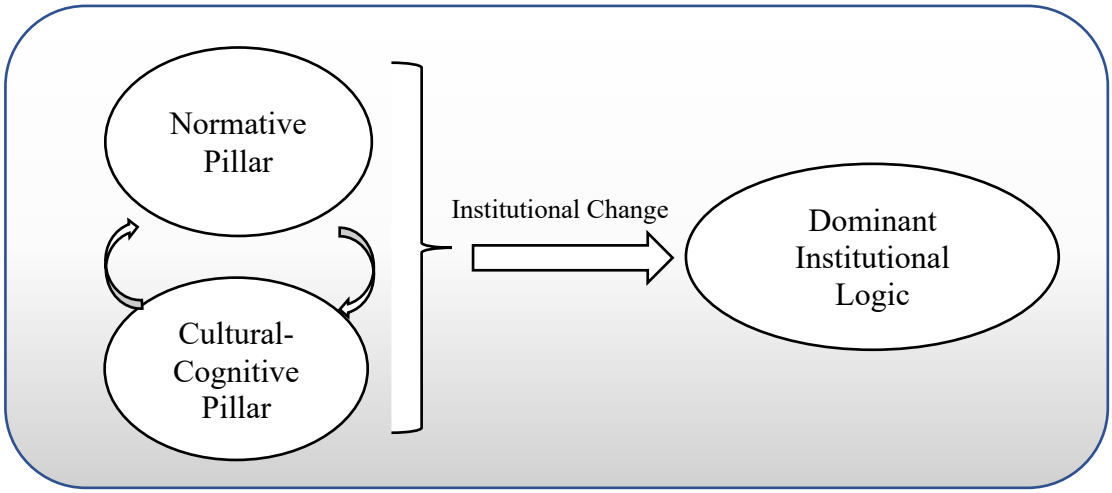

Figure 6.8 Interplay of Normative and Cultural-Cognitive Pillars

This research concludes that there is no de-institutionalisation stage in the institutionalisation path to OGD adoption. This contradicts Tolbert and Zucker (1999) and Currie and Finnegan (2011) who argue that the de-institutionalisation stage is essential, in the latter case for the UK healthcare system adoption. Although ODG adoption has a political aspect, and de-institutionalisation is to address political and ideological arguments, this stage is not necessarily applicable to all IS adoption in developing countries. This may be because of different cultural norms in developing countries (Chen *et al.*, 2006). Moreover, the OGD initiative is at an early stage where institutional change has not been influenced by long-term resistance.

6.3.4 The Influence of Institutional Pillars to OGD adoption

The regulative, normative and culture-cognitive pillars are constitutive in the institutional environment with relative effects that exert various degrees of influence. The pillars

reinforce institutional change in practices that contribute to the institutional context of OGD adoption. However, the prominent institutional pillars are normative and cultural-cognitive, with the regulative pillar exerting less influence; the last is depicted as dotted lines in Figure 6.9. Due to uncertainty in the environment and lack of knowledge and experience of new open data technology, countries tend to mimic early adopters. However, organisations at the micro-level are prone to accept institutional change and adapt shared mind sets and cognitive behaviours from the institutional environment. The institutional pillars, as illustrated in Figure 6.9, affect the OGD initiative over space and time.

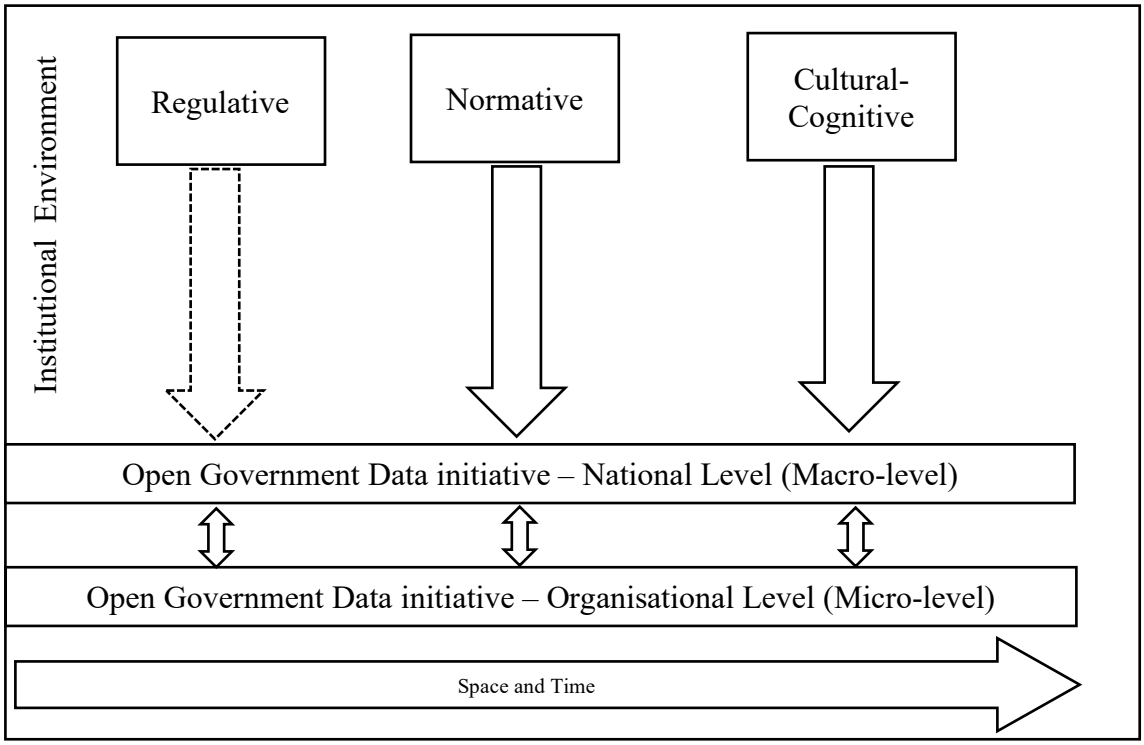

Figure 6.9 Institutional Pillars of Open Government Data Initiative

At the national level, the adoption of OGD is advancing at a slow pace because of unresolved tensions. This research reveals that the OGD initiative at the macro-level is subject to effects which vary in strength over space and time, as suggested by Wang and Lo (2016), before the desired outcome is achieved. Regulative pillar has a significant effect on the adoption in its guise as conflicting pressure. The outcome for OGD is significantly affected when the three pillars are combined (Scott, 2014, 2011). Unlike Altayar (2018) study of OGD, this research finds that the regulative pillar is present only as less-prominent coercive pressure. The combined pressure from the three pillars constrains the institutionalisation of OGD adoption, especially in developing countries where the process tends to be longer (Wang and Lo, 2016).

In conclusion, the interaction of institutional pillars in the institutional environment of the OGD initiative has effects of various strengths. This finding supports the findings of several scholars (Frumkin and Galaskiewicz, 2004; Hossain and Chan, 2015; Alzadjali and Elbanna, 2019). However, research shows that coercive pressure is the least significant in the OGD initiative, causing an imbalance in the adoption at the national level. Normative and cultural-cognitive pillar are more prominent, with significant effects. The normative interplay is a progressive outcome for the OGD adoption; however, cultural-cognitive pillar may hinder the OGD adoption at the micro-level.

The next section discusses the institutional logics identified in the institutional environment, and how they enable/constrain the OGD initiative. It addresses the research sub-question: *How do the institutional logics in the institutional environment affect the adoption of OGD?*.

6.4 Institutional Logics Perspective of OGD Adoption

As presented in the research findings in Chapter 6, several institutional logics were revealed from the OGD phenomena, captured qualitatively using the pattern inducing technique that identifies patterns of behaviour and practice (Reay and Jones, 2016); these predict activities that ensure stability in the organisation (Thornton and Ocasio, 2008, Thornton et al., 2012, Reay and Hinings, 2009, Scott, 2011).

One dominant logic and three competing logics were found in the institutional environment of the OGD initiative. The dominant logic is *Institutional Acceptance Logic (IAL),* whilst the competing logics are Institutional Roles Logic (IRL), Ownership and Control Logic (OCL) and Institutional Capabilities Logic (ICL). The institutional logics derived from the phenomena researched encompass the five principles of the Institutional Logics Perspective (ILP) (Thornton *et al.*, 2012). The following sections discuss how the dominant and competing logics are captured, perceived, interpreted and enacted; they highlight how and why the ILP enable or constrain the OGD initiative.

6.4.1 Institutional Acceptance Logic (IAL) – Dominant Logic

IAL represents common norms and wider acceptance in the societal system. It is defined in this research as the *"logic that drives organisations at macro-level and micro-level to adopt the OGD initiative by the objective to attain projected benefits at the operational and strategic level that resulted to an institutional acceptance consensus of the OGD initiative"*. This overarching dominant logic is framed by three subordinate logics, corporate,

professional and market , as illustrated in Table 6.2. The findings agree with Bunduchi *et al.* (2019) study of human resource information systems in the NHS public health sector. The subordinate logics have an equal influence on the dominant logic. However, this finding contradicts Burton-Jones *et al.* (2019) in their study of health IT systems in Australia, which suggested that corporate logic prevails over professionalism logic in the adoption phase.

Table 6.2 Subordinate Logics framing Institutional Acceptance Logic

Dominant Logic / Subordinate Logic	**Corporate Logic**	**Professional Logic**	**Market Logic**
Institutional Acceptance Logic	Presents a strategic driver to influence wider acceptance in implementing OGD to achieve efficiencies in government operations.	Stems from the regulators' professionalism to persuade government organisations to adopt OGD through the strategic and operational drivers.	Presents an operational driver to influence wider acceptance of OGD by the means of competition between government organisations to operationalise OGD.

Following the definition, IAL is captured from the institutional environment with strategic and operational drivers that lead to common norms and beliefs by the stakeholders in accepting OGD. The OGD initiative case study shows that both drivers were present and indicate the perceived benefits from the OGD initiative. This research elucidates that IAL in information system adoption is influenced by the strategic and operational drivers of OGD, which shape the dominant logic (IAL) as illustrated in Figure 6.10. The strategic drivers affect the macro-level, and the operational drivers affect the micro-level of OGD adoption.

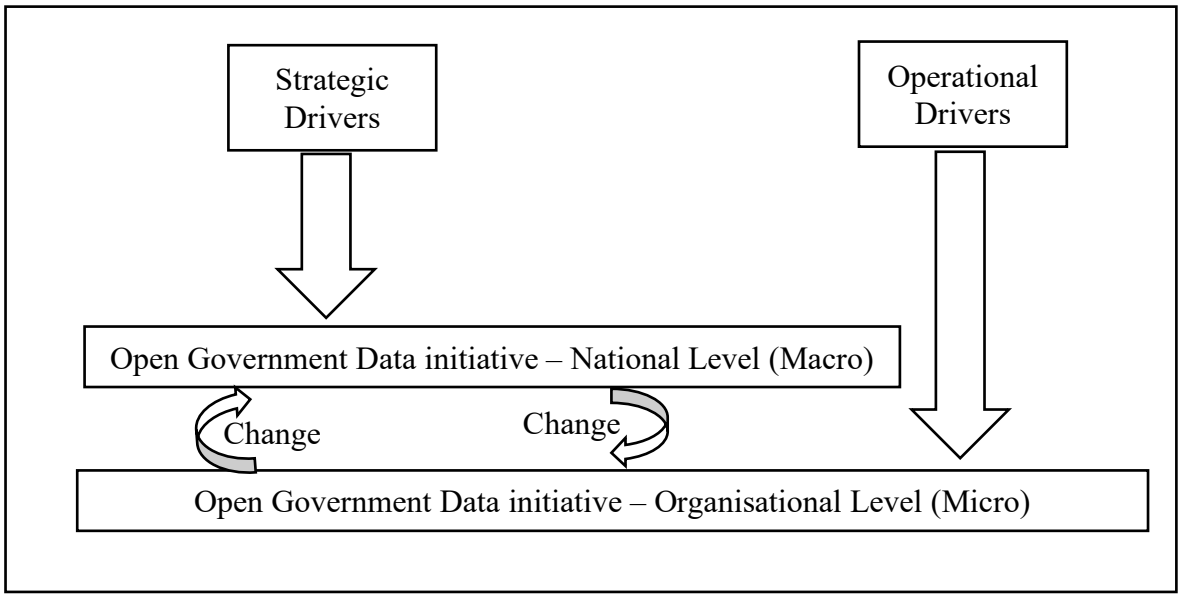

Figure 6.10 Institutional Acceptance Logic

6.4.1.1 Strategic Drivers of IAL

The OGD initiative strategically focuses on increasing government transparency, citizen engagement and creating public value to the society and economy by increasing efficiencies of the government operations (Janssen, 2011; Janssen *et al.*, 2012; Keen *et al.*, 2013; Bertot *et al.*, 2014; Mellouli *et al.*, 2014). These strategic aims are consistent with the literature that identifies the motivations in adopting OGD in several case studies in developed and developing countries (Wijnhoven *et al.*, 2015; Attard *et al.*, 2015; Hasan, 2018). Despite the cultural barriers to adopting OGD stated by Attard *et al.* (2015), the motivations to adopt OGD are similar in context and objective. The similarities are present in the form of a public sector (state) logic that prompts institutional acceptance of the OGD across government organisations (Bunduchi *et al.*, 2019).

The regulative and normative institutional pillars influence organisational behaviours and play a vital role in shaping the market subordinate logic. The OGD initiative in the initial stage is influenced by the external regulative and normative pressures, as discussed earlier in this chapter. However, the institutional practices and organisational behaviours adhering to these external pressures are not significant for the sustainability of the OGD initiative. OGD was seen by government as an opportunity to increase the country's ranking in open data and to compete regionally in e-transformation, represented as subordinate market logic.

Furthermore, adherence to the international community is a way of avoiding criticism that might affect national transparency. Thus, the external pressures constitute a temporary coercive pressure to signal conformity to the world (Scott, 2014, 2011). This research thus reveals that the macro-level reacts at the initial stage to fulfil the requirements of the international community, which is contrary to the micro-level perspective that seeks the perceived benefits of OGD. The logic shift in meaning persuaded the government organisations to implement OGD, for its perceived benefits. The macro-level persuasion to government organisations to join and adopt the initiatives represent political normative pressure on the micro-level, supported by the professionalism of the regulators.

The strategic drivers at the macro-level to adopt OGD were evident in the institutional practices as window dressing and a bandwagon effect of the current global trend for open data. These are either political or economic drivers (Chan, 2013), representing subordinate corporate logic. The shift does not introduce a new logic but employs corporate logic in order to achieve efficiencies in government operations. Moreover, the subordinate market logic facilitates the institutional acceptance logic triggered by competition. Government organisations aim for competitive advantage in offering better services to the public and promoting economic and political gains. The subordinate market logic stems from the national macro-level where the government encourages government organisations at the micro-level to compete through for the national Award for Excellence in eGovernment (MoTC, 2018). Therefore, the first government organisation adopters intended to be at the forefront in the OGD initiative.

The strategic drivers in contemporary government organisations in the early stage of adoption allow wider acceptance, transforming aspects of the public sector into profit-making organisations. In 2013, the ITA launched Oman's open data portal as the Official eGovernment Services Portal (Omanuna, 2013). The inauguration and announcement of the OGD initiative by the IT regulator indicated strategic intent to take the initiative at the national level (Muscat Daily, 2013; Omanuna, 2013). Although the initial phase involved only ten government organisations, the strategic drivers played a role in gaining wider acceptance in the institutional environment, presenting an institutional yardstick of government organisations (Thorén *et al.*, 2018).

The change of government structure introduced in 2017 2012 strengthened the initiative at the national level. The change embodied the introduction of a Data regulator as the defined authority responsible for all the data-related matters in the country. This led to

implementation of the national formal data portal www.data.gov.om governed by the National Statistics Centre (NCSI, 2017), and indicating a shift of responsibilities from the IT regulator to the newly introduced Data regulator. The structural change of government introduced a competing logic to the IAL, discussed below.

The NCSI's national data portal facilitated data openness for the public as a formal national structural element (Scott, 2014, 2011). National structural elements entail national direction of an open data portal in a centralised approach. This centralised approach is recognised as common OGD governance in developing countries as it allows national control of data openness (Attard *et al.*, 2015). However, a de-centralised approach was followed in the institutional environment by several government organisations. The shift entails advancing the dominant logic; however, the respond is due to uncertainty of the OGD initiative. The centralised approach ensures conformity under one national portal (Attard *et al.*, 2015), while the decentralised approach at the micro-level still allows organisations to work for competitive advantage.

The organisations' behaviour within the institutional environment is a cultural aspect that contributes to misalignment between the national objectives of OGD and micro-practice. The declared national objective was to create culture-driven organisations that promote openness, rather than to promote competition between government organisations. However, the cultural aspects in developing countries are different from those in developed countries. The Omani culture would tend to accept the OGD initiative in the initial stage for political reasons, and to adhere to the societal norms and common beliefs in the institutional environment. However, the institutional practices at the micro-level vary according to the actors' cognitive perceptions of the OGD outcome.

The argument for government reform is consistent with the literature, where public sector organisations are moving from their administrative role to a profit-making role (Matthews and Shulman, 2005). Therefore, emerging technologies like open data present an opportunity for public sector organisations to generate greater revenue. This is reflected indirectly by providing better and more transparent services to ease organisational operations and maximise the government's revenue in the longer term. The national macro-level acknowledges the importance of the OGD initiative where aims and objectives constitute acceptance logic for the government organisations to adopt open data.

6.4.1.2 Operational Drivers of IAL

In addition to the strategic drivers at the macro-level, several operational drivers at the micro-level inspire government organisations to adopt OGD. The organisations at this level acknowledge the importance of open data in order to achieve benefits. Inter-organisational interaction is one of the main benefits perceived by government organisations at the micro-level to facilitate eGovernment transformation. The objective is to utilise the open-linked data (Zuiderwijk *et al.*, 2012b) as a means of integrating and collaborating with other government organisations to make sense of the data. The responses in the form of institutional practices create a model for other organisations to follow and mimic (DiMaggio and Powell, 1991; Scott, 2011). Moreover, the institutional acceptance of the OGD initiative at the national level was motivated by the change in how data contributes to the decision-making process. The benefit realisation perceived is to enhance the decision-making process, to make informed rather intuitive decisions. Governments aim to engage citizens in the decision-making process (Wijnhoven *et al.*, 2015; Weerakkody *et al.*, 2017b). Thus, citizen engagement shifts the burden from the organisation's management to the public, to avoid public criticism.

Value creation from OGD is guided by the market institutional logic. Creating value for the national economy is a key benefit that drives the OGD operationally. The value of open data is not limited to making better decisions, but also stimulates the national economy and business growth. Maximising the economic value of open data for private sector use, especially making opportunities for SMEs, is an important benefit perceived by government organisations (Ojo *et al.*, 2015). The value creation from building applications is a further example of market institutional logic.

To summarise, the researcher concludes that the dominant institutional logic in OGD adoption is institutional acceptance logic, complemented by corporate, professional and market logic. Organisational behaviours and practices reflect a consensus of acceptance of the open data initiative, triggered by the macro-level strategic drivers. The practices and behaviours at both macro- and micro-levels are shaped by the change from the current state of institutional practices (Llamas-Sanchez *et al.*, 2013) to the desired state, which implies adoption of OGD (Tolbert and Zucker, 1999).

6.4.1.3 Institutionalisation of Dominant Logic

This research shows that the institutionalisation of OGD adoption is a linear process. This finding in line with the linear process model of Tolbert and Zucker (1999), of moving from

one stage to another. However, the institutionalisation path takes longer time in each stage. In a similar context of large-scale and complex IS implementation, a study by Currie and Finnegan (2011) of healthcare information system implementation in the UK revealed that the implementation was hampered by non-linear institutional logic. Thus, this research finding contrasts with these findings and argues that the institutionalisation process is linear in the case of OGD adoption, and that de-institutionalisation was not triggered as the new institutional logic progresses. Failure of IS adoption means abandoning the current process; however, OGD adoption failure at an early stage is unlikely to occur or involve de-institutionalisation. Moreover, the research findings show a reciprocal relationship between the micro-level and macro-level in the institutional environment, as illustrated in Figure 6.10. Therefore, the dominant logic entails institutional change in a similar way to the competing logics, and the change is not only triggered at the micro-level as suggested by Davidson and Chismar (2007).

The past experiences of eGovernment initiatives has affected the institutional trust between the IT regulator and government organisations. Institutional trust plays a role as an operational driver to adopt OGD. Trust entails building relationships between organisations (Ratnasingam, 2005). However, interaction-based trust does not change the norms, structure or procedures (Bachmann and Inkpen, 2011). Moreover, Bachmann and Inkpen (2011) also suggest that a third-party role as mediator is vital in building trust relationships, to shape the institutional practices and allow change to occur. However, the regulator's reputation in the institutional environment is vital in building trust into the initiative as it affects the legitimacy of the IT regulator (Deephouse and Suchman, 2008; Bachmann and Inkpen, 2011). Thus, the historical aspects of regulators' effectiveness affect the institutionalisation of the OGD initiative.

The third-party role as trustee is vital to the IT and Data regulators in OGD adoption. However, unsatisfactory past experience of the IT regulator in implementing IT initiatives was sensed by organisations at the micro-level, in practice, assumptions, values, beliefs, and rules (Jackall, 1988; Friedland and Alford, 1991). Nevertheless, government organisations at the micro-level are enthusiastic about the role of the Data regulator, representing professional logic. Professional logic reflects an acceptance norm in the macro-level organisations of the Data regulator's specialisation in data.

In summary, IAL is the dominant logic that shapes the behaviours of organisations in adopting OGD. The logic is shaped by two types of driver, strategic and operational, that

exist at macro- and micro-levels. Despite the presence of IAL, adoption and implementation of the OGD initiative are not fully institutionalised, because of the rivalry logics which emerged as the project progressed from the comprehension to the adoption phase (Swanson and Ramiller, 2004). This conclusion is in line with Bunduchi *et al.* (2019), who suggest that the influence of different institutional logics changes in IS projects as the project progresses from the comprehension to the implementation stage. In this research IAL is complemented by corporate, professional and market logic; however, the acceptance logic prevails in the environment with a slower rate of adoption compared to other e-transformation initiatives such as the G-cloud initiative. The following sections discuss the findings related to the competing logics.

6.4.2 Institutional Roles Logic – Competing Logic

The institutional roles logic (IRL) captured in the institutional environment of open data present a competing logic. IRL is defined in this research as *"the logic of an interpretation of practices and materials reflected by the roles and responsibilities of the organisations in the OGD institutional environment that encompasses the strategic direction, powers and authority, laws and regulations; and strategic management"*. It is considered as a competing logic to the institutional acceptance logic in adopting OGD. From the definition, IRL is categorised into strategic direction, power and authority, laws and regulations; and strategic management.

6.4.2.1 Strategic Directions of the OGD Initiative

An organising vision entails motivations and alignment between the initial desired objectives and the national objectives (Swanson and Ramiller, 2004; Currie, 2009). An organising vision is unlikely to be embedded in organisational structures and processes in the early stage of a project in developing countries, and the vision of OGD was not communicated clearly early on to the government organisations, leading to a strategy direction misfit. The strategic direction is a guide for the organisations at different levels in adopting and implementing the OGD (Chandler, 1990). However, the miscommunication of the organising vision cascaded down to the organisations' level, resulting in the strategy misfit between macro-level and micro-level. The macro-level had an organising vision at the comprehension phase, and at the later stage of adoption, the IT regulator stated that the vision of a national OGD was to ensure wider access to government data by making the it available for use, re-use, download and redistribution with the objective of creating new services and improving the quality of

public services (Omanuna, 2015). However, the failure to communicate with micro-level resulted in ambiguity. This research confirms that an organising vision is unlikely to be framed and agreed upon in developing countries at the early stage. This could be related to the political will to facilitate data openness to the public.

The absence of a clear road map for the OGD initiative had a significant impact on the institutionalisation of the adoption. The strategy misfit influenced the structural transition from the original state to the desired state and caused minimal institutionalisation of the OGD initiative (Cooper and Zmud, 1990; Swanson and Ramiller, 2004). A case study by Parycek *et al.* (2014) in implementing open data in the city of Vienna suggested that the strategy is vital for OGD success. Moreover, this research shows that aligning open data strategy with business strategy and objectives is essential in gaining better value (Gregor *et al.*, 2007). Therefore, a roadmap for the initiative would have transformed the vision and mission, bridging gaps in the organisational capabilities and technology (Phaal *et al.*, 2004; Gichoya, 2005)

The strategic direction at the national level is essential for the stakeholders to participate in establishing a roadmap for the open data. Despite the existence of strategic components for the vision for the open data initiative, disengagement between the macro-level and the micro-level is evident. This is represented in the behaviours and institutional practices of different organisations at the micro-level, resulting in chaos in the different organisations. As a result, organisations were motivated to establish sub-national open data sections on their portals. This action ignores the government direction to establish a centralised national portal. Moreover, the organisations who had established sub-national open data portals also lack a defined roadmap. Arguably, the misalignment is likely to occur when a national-level roadmap encourages rivalry logic. The rivalry logics in the institutional environment slow the pace of adoption and present government organisations at the micro-level with unclear strategic directions. The absence of strategy and a road map is a transition period for the initiative, given the instability of authority and the roles of the national responsible organisations.

Benchmarking the OGD adoption against other initiatives affects the strategic directions by introducing a rival voice in the institutional environment. Addressing the historical aspect is one of the institutional logic principles (Thornton *et al.*, 2012), to interpret practices in order to provide meaning to social reality. The historical events guide government organisations'

behaviours, assumptions and beliefs (Jackall, 1988; Friedland and Alford, 1991). Government organisations link their experiences with the IT regulator in different initiatives as a benchmark for the open data initiative. They cognitively link the OGD initiative with previous eGovernment transformation initiatives and experience. Therefore, several organisations voiced their demand to assign responsibility for the initiative to the Data regulator, increasing the tension between the regulators and resulting in conflict hindering the progress of the initiative. The next element of IRL is power and authority in the institutional environment.

6.4.2.2 Power and Authority of the Regulators

Addressing power and authority from the institutional perspective requires understanding of the institutional arrangements in the institutional environment. The institutional arrangements are structurally necessary to provide an appropriate institutional foundation for the OGD initiative. As suggested by Hollingsworth (2000) and Hollingsworth and Lindberg (1985), they include a designated organisation at the national level to direct the initiative; thus the structural elements are embedded in different parts of the strategy and policies that guide the adoption (Bates, 2014; Abu-Shanab, 2015; Nugroho *et al.*, 2015). Moreover, the OGD initiatives are enabled by information technology to transform the national culture through transparency, accountability and economic growth, confirming the IT regulator's role in the institutional environment (Gonzalez-Zapata and Heeks, 2015). However, the government's organisational structure was subject to change, establishing a Data regulator (NCSI) in 2014 as the institution responsible for data initiatives in Oman (Omanuna, 2015). This change in the government structure conflated the roles and responsibilities of the two regulators.

Establishing the right roles and responsibilities with adequate empowerment is a crucial element in adopting OGD at the national level. The power struggle between the regulatory authorities affected the OGD initiative, with government organisations at the micro-level unable to achieve the objective of open data. Thus, assigning a single designated organisation for the open data is essential in determining the structural and material elements that constitute the institution (Greenwood *et al.*, 2011; Scott, 2008). The literature shows consistent agreement, for example in a cross-national comparative study of open data initiatives in five countries needing a designated organisation for open data implementation at the national level (Nugroho *et al.*, 2015). However, the regulators derive their legitimacy

from sanctioning power and the regulative pillar of the institution (Scott, 2011; Thornton *et al.*, 2012),

The regulators achieve their legitimacy in the institutional environment through the sanctioning mechanism. The IT regulator's legitimacy is derived from the power of the directives issued to the government organisations rather than from a regulatory mechanism. On the other side, the Data regulator's legitimacy stems from the royal decree mandating all government organisations to publish their data. As a consequence of this conflation of empowerment levels, the regulators are unable to enforce data openness in the government organisations at the micro-level. In fact, the regulatory authority administering the OGD initiative should be armed with a sanctioning mechanism to mandate and enforce the adoption of OGD at the national level.

The conflict triggered the shift from the centralised approach to a decentralised approach which were later accepted by the regulators. The change increases the heterogeneity which enables different competing logics that increase institutional complexity (Reay and Hinings, 2009; Thornton *et al.*, 2012; Greenwood *et al.*, 2014). Thus a competing logic prevailed and raised the rivalry in the OGD institutional environment (Hensmans, 2003).The next element in IRL is the laws and regulations.

6.4.2.3 Laws and Regulations Foundations Pillar

The OGD initiative in the case of Oman lacks a foundation pillar of laws and regulations to support the initiative strategically, such as the right to information. The basic pillars of information freedom and privacy in government openness are essential to gain a higher adoption rate for the OGD initiative. This finding is consistent with McDermott (2010) and Schermann *et al.* (2014), who asserted the importance of rights to information and privacy acts as the main pillar in building open government. Moreover, the open data rules are to regulate the processes at the national level, to enforce acceptable norms and behaviours by government organisations (Guasch and Hahn, 1997; Hood *et al.*, 1998). The open data laws and regulations entail a complex structure affecting several aspects of national legislation that require strong ties and collaboration between government organisations (Zuiderwijk and Janssen, 2014).

The current laws and regulations here are outdated and constrain the formulation of new policies. This finding agrees with Yang *et al.* (2015) study of Taiwanese open data suggests

that legislation and policy are the strongest constraints on open data in East Asia. Despite the lack of essential laws and regulations, the IT regulator of the Oman OGD initiative introduced an *Open Government Data Policy* (ITA, 2017b) to support the operational processes and activities in the institutional environment (Anderson, 1990). However, this policy lacks the supporting laws and regulations necessary to support and advance the initiative to the progressive stage.

Open data policy is another dimension of the OGD legislative foundation pillars. As developing countries react differently to emerging technologies such open data (Dunn, 1981; Zuiderwijk and Janssen, 2014), this research argues that when countries establish new policies in an uncertain environment, OGD adoption results in compound failure. Arguably, the consequences are misalignment between the macro-level and micro-level with the introduction of different institutional practices by government organisations to benefit from other laws in publishing their data. Moreover, the institutional practices at the macro-level contradict the public need for the data (Dawes and Helbig, 2010; Dawes *et al.*, 2016). Therefore, misalignment is inevitable if the policies are not harnessed with appropriate laws and regulations. The literature confirms this argument; for example, an empirical study by Zuiderwijk and Janssen (2014) of seven Dutch governmental policies shows a misalignment between the data policies and users as the policies focus on internal challenges.

Most developing countries lack the basic laws and regulations to supports the OGD initiative. Their absence allows organisations to resist opening their data to the public, consequently affecting OGD adoption at the national level. The right to information legislation allows citizens to access government data (Nugroho *et al.*, 2015), thus the absence introduces competing logic from government organisations in terms of privacy and security. The appropriate classification of data in terms of security sensitivity to protect individuals and organisational data is missing in the institutional environment. This finding confirms the literature that suggests that classification is essential for any data platform to gain added value from the data creation and dissemination (Zuiderwijk and Janssen, 2014; Conradie and Choenni, 2014; Weerakkody *et al.*, 2017b). Likewise, the literature confirms that OGD needs to address the data security and privacy of individuals and the public; the absence of privacy legislation is a significant barrier to OGD (Janssen *et al.*, 2012; Barry and Bannister, 2014; Wang *et al.*, 2019). This finding is not limited to developing countries; however, the basic pillars of privacy legislation are generally not established there.

Although the previous discussion stresses the importance of laws and regulations for OGD, the policies and supportive regulations must be updated frequently. Thus, engaging the public in rule-making is an essential element in obtaining public endorsement (Clarke and Margetts, 2014; Weerakkody *et al.*, 2017b). A periodic review and update of the laws and regulations with stakeholder engagement plays a prominent role in OGD adoption. Nugroho *et al.* (2015) study of open data policies in developing and developed countries agrees with the finding that the legislation for open data in developing countries is more likely to be missing than in developed nations.

The decoupling of *means-end* and *policy-practices* is evident in the institutional environment, so establishing the foundations of laws and regulations at the national level is a mandatory process prior to establishing the initiative. Although Boxenbaum and Jonsson (2017) suggest abandoning the project if the policies are not aligned with practice at the micro-level and the final outcome does not achieve the purpose of the adoption, the competing logics affects the OGD can be managed and reconciled and allow the sustainability of the logics (Pache and Santos, 2013). Despite the mimic mechanism suggested by Powell and DiMaggio (2012) and Scott (2014) to follow other countries when uncertainty exists, this research shows that this approach is not followed where the cultural differences have a significant role, in particular in developing countries (Chen *et al.*, 2006; Zuiderwijk and Janssen, 2014; Zhao and Fan, 2018). In addition, this study suggest that supporting laws and regulations should be initiated at the higher government level as they affect other non-technological or data-related areas.

6.4.2.4 Strategic Management Approaches

The strategic management aspect of IRL entails different approaches to managing OGD adoption. Martinez-Simarro *et al.* (2015) suggest that strategic management influences the performance of national OGD initiatives. This research shows that the management of government organisations have indeed adopted different strategic approaches. The regulators' strategic management styles influence the government organisations is in the form of a top-down approach. However, at the micro-level, the government organisations are applying a bottom-up approach to ensure appropriate control of the data openness. Therefore, the existing strategic management is complementary in situating the two different approaches within the institutional environment. The top-down approach entails executive management involvement in the OGD adoption success (Wechsler and Backoff, 1986).

Executive involvement accelerates the adoption and implementation of the initiative (Jarvenpaa and Ives, 1991).

The uncertainty of how open data is managed hinders government organisations from participating in the early stage of OGD adoption. Top management participation at the micro-level to approve the dissemination of data imposes a closed culture. Unlike in developed countries, the culture in developing countries is less transparent and tends to be closed (Chen *et al.*, 2006; Ho and Im, 2015), impeding the adoption of open data (Van Alstyne *et al.*, 1995; Evans, 2011; Kostkova *et al.*, 2016). Thus, this research suggests a hybrid strategic management with greater weight given to the top-down approach to overcome the closed-culture barrier. Furthermore, adopting the top-down method of strategic management allows the leadership to gain the desired outcome at the national level (Gichoya, 2005; Pardo *et al.*, 2012).

The non-existence of institutional entrepreneurs limits the progress of OGD initiatives. The literature tends to assume that the role of institutional entrepreneur is vital in transforming the culture and managing the radical change in the institutional environment, implying the top-down approach (Fathul and Maung, 2013; Hardy and Maguire, 2017; Hinings *et al.*, 2018). However, this research shows that OGD adoption at the early stage requires intensive interaction and collaboration at the micro-level, so the institutional entrepreneur should adopt a bottom-up approach.

In summary, this research shows that IRL constrains the OGD initiative from being fully institutionalised. Moreover, the tension between the micro- and micro-levels contributes negatively to the adoption of the OGD initiative. The institutional practices and observations led to increased tension between the macro- and micro-levels, guiding the government organisations to resist the adoption. Moreover, the conflation of roles and responsibilities and lack of fundamental pillars of legislative foundation, such as a right to information act, further encourage institutional practices of resistance. Thus, reconciling the competing institutional roles logics requires collaboration between the regulatory authorities at the national level to establish an appropriate legal foundation, and adopting a national-level strategy for implementing open data. The next section discusses ownership and control as a competing logic in the institutional environment.

6.4.3 Ownership and Control Logic - Competing Logic

The Ownership and Control Logic (OCL) is defined, in this study, as *"the logic of different institutional practices and materials in the OGD institutional environment that resist data openness due to the logic of Loss of Privileges and Control, Fear of Criticism, and Data Governance"*. OCL is a competing logic to IAL. From the definition, OCL captured from the institutional environment comprises loss of privileges and control, fear of criticism, and data governance to rival the IAL in the open data initiative in Oman.

6.4.3.1 Loss of Privileges and Control

The competing logic of ownership and control hinders the macro-level in changing the micro-level attitude. Despite the regulators' intent for openness at the macro-level, government organisations at the micro-level resist change. This research suggests that a closed government culture predominates, and indicating greater resistance to OGD adoption. The sense of losing the privileges and control from data power realised by actors at the micro-level impedes OGD adoption, the resistance to openness affecting the status quo in controlling the data. Data openness takes away the power of withholding data and diluting it by sharing it among all stakeholder (Van Alstyne *et al.*, 1995). This resistance at the micro-level affect the OGD initiative at the national level.

The data withheld by government organisations reveals resistance to adopting the OGD initiative; they override the macro-level pressure to adopt the OGD by publishing data in aggregate format. The practice is to gain public satisfaction, enhance the organisational image and avoid public misinterpretation of the data. The withholding government data not only raises concerns over government transparency by the international community and violates the objective and principles of open data (Open Data Working Group, 2007), but also means that the government organisations are not maximising the value from open data. The two conflicting logics represent a disconnection between the macro-level objective of achieving transparent government and organisational behaviours at the micro-level.

Despite the open data principles assuring free access to government data, the principle of free data remains an area of dispute among different government organisations. They believe they own their data and that it has a commercial value. Generating value from government assets entails a change in the concept of public sector organisations being service oriented. Therefore, the government organisations in the case study demand to generate revenue like the profit-making organisations. This argument involves a misconception of the open data

principles and objectives (Open Knowledge Foundation, 2012; Open Knowledge International, 2018), but is nevertheless evidence of resistance to open data, related to the potential loss of financial privileges.

Interoperability between government organisations is not evident, and the inter-organisational integration of open-linked data is not functional, due to the lack of data ownership classification (Pardo *et al.*, 2012). Conradie and Choenni (2014) studied six local government organisation's loss of privileges and suggested that "opaque ownership" of non-personal data inhibits local governments from disclosing data to the public, as a result of fear of loss of control and privileges by the data custodian.

6.4.3.2 Fear of Criticism from Data Openness

One of the primary objectives of the open data movement is to increase transparency and allow public engagement with government organisations (Open Knowledge Foundation, 2012). However, it was evident in the case study that these organisations fear criticism from the public. Several scholars acknowledge that the primary motive for government organisations withholding the data is the fear of criticism (Van Alstyne *et al.*, 1995; Evans, 2011; Kostkova *et al.*, 2016). However, this research shows that the fear of criticism is not limited to public criticism but extends to other government organisations. Thus, open-linked data is not facilitated, to avoid criticism of data reliability and accuracy from peer organisations.

The fear of criticism stems from the pressure of social expectations (Wang and Lo, 2016). The social expectations emanate from the public demand for transparent government. There are few accountability measures in developing countries, and openness would allow the public to gain insight into government operations and question the decision-making process, daily operations and business processes. The government organisations also fear misinterpretation of the data by the public, leading to legal disputes.

Concerns about data quality and accuracy affirm the fear of criticism hindering government organisations from revealing data to the public. The views at macro-level and micro-level are consistent, although the macro-level pressures the micro-level to take further action to cleanse the data and ensure data accuracy in order to generate value from the data (Luna *et al.*, 2014). In addition, the OGD initiative is complex where the data is derived from multiple sources, increasing the likelihood of inaccuracy. The data is multifaceted and requires

horizontal and vertical integration, as suggested by George *et al.* (2014). The diverse cultures of government organisations are unlikely to ensure smooth transition through the institutional change.

From the above discussion, the fear of criticism finding is consistent with Nugroho *et al.* (2015) comparative study of OGD in developed and developing countries. In developing countries, it is bounded by the level of bureaucracy and democracy acceptance in the institutional environment (Kenei, 2012; Kassen, 2017). However, the findings revealed that the fear of criticism is not limited to fear from the public but extends to peer organisations, representing a blame culture in the national initiative. Thus, the inter-organisational data sharing is constrained by the organisational culture, reinforcing the challenges to the OGD initiative.

6.4.3.3 Data Governance of OGD

Data ownership concerns who owns what and at what level. OCL prevails in the institutional environment due to the lack of data ownership classification. The findings revealed that data ownership is not formulated at the national level, encouraging government organisations at the micro-level to resist data openness. This resistance stems from the belief that organisations own the data they create and have no obligation to open it to the public. The competing logic of data governance affects the OGD initiative particularly in countries where the data ownership is not regulated and classified. Thus, the lack of national data ownership classification hinders the OGD initiative at the early stage. This "opaque ownership" inhibits organisations from disclosing data to the public (Conradie and Choenni, 2014). The finding agrees with Zuiderwijk and Janssen (2014) and Weerakkody *et al.* (2017b) who acknowledge data ownership as a barrier to open data. However, these scholars discuss data ownership from the citizen's rather than the organisational perspective. Addressing the organisational perspective, Susha *et al.* (2015) empirical study of the Netherlands and Sweden agree with this research finding, although focusing on data ownership from the view of open data use. Thus, this research addresses the gap and argues that data ownership is not limited to the citizens' perspective and data use.

Data privacy is another facet of data governance in OGD. The consequences of data ownership drive organisations into the area of privacy issues for individuals and organisations. The finding agrees with Wang *et al.* (2019) study of UK OGD and acknowledges privacy as a barrier, indicating that the privacy issue is not limited to

developing countries. The case study revealed the existence of clauses in different laws which address privacy. However, the institutional environment lacks an independent privacy act and data ownership classification. This research argues that the nature of OGD as a national initiative entails institutional complexity with a high degree of entanglement of different organisations. Moreover, lack of a designated organisation at the national level hinders the formulation of different regulations, policies and data governance. Despite the existence of competing logic at the micro-level, regulators at the macro-level are guided by enthusiasm for the perceived benefits of open data and promoting transparency, which eases the competing logic of privacy and data ownership.

In summary, the ownership and control logic constrains the OGD initiative from being fully institutionalised. The competing logic represents a disconnection between the macro-level that promotes transparent government and organisational behaviour at the micro-level resisting OGD adoption. The main argument presented in this section emphasises the power over data and how organisations fear to lose it. Moreover, data ownership hinders organisations from adopting OGD and slows the overall progress of the initiative at the national level. OCL is framed by an unstable government structure that creates through lack of a single organisation responsible for the OGD. This instability and the undefined roles and responsibilities at the macro-level affect the introduction of data governance in the institutional environment. The data ownership and control logic is stronger in countries that lack national data ownership classifications and related open data policies.

6.4.4 Institutional Capabilities Logic - Competing Logic

The Institutional Capabilities Logic (ICL) is defined in this study as *"the interpretation of practices of different challenges within the institutional environment that represent a gap in capabilities among organisations, where the gap present in three capabilities: Human Capital Capabilities, Technology Capabilities and Organisational Capabilities to adopt the OGD"*. ICL is considered as a competing logic to the Institutional Acceptance Logic (IAL) in regard to the OGD initiative. From the definition, it is categorised into the capabilities of human resources, technology and the organisation, rivalling IAL in the institutional environment of the OGD initiative in Oman.

6.4.4.1 Organisation's Capabilities Gaps

The institutional practices are guided by the logic of organisational capabilities that evokes a gap between government organisations. Organisational capabilities refer to the non-

technical capabilities, where variations affect the alignment between organisations at the micro-level and regulators at the national level.

The culture of the government organisations impedes harnessing the organisational capabilities in the OGD. This research shows that the regulators made several efforts to minimise the gap in organisational capabilities at the micro-level; however, their culture hampers these efforts. The institutional practices originate from the organisations' readiness to support and value open data's benefits to the organisations and the country. This finding supports IS studies which claim that organisational culture affects eGovernment initiatives (Leidner and Kayworth, 2006; Carter and Weerakkody, 2008; Zhao and Fan, 2018).

The cultural difference between government organisations results in conflict and uncertainty about the OGD initiative. The finding is consistent with Zhao and Fan (2018) study of open data in the city of Shanghai, which revealed that organisational culture affects OGD according to the resource-based theory. However, the findings of this research confirm the centralised implementation approach of institutional logic perspective. The uncertainties have led organisations with better capabilities to adopt OGD independently from the national initiative direction. This practice widens the gap between organisations in the institutional environment, decoupling it from the national objectives of efficiency and competitive advantage. Scott (2014) suggested that decoupling is more likely to occur as a result of external regulatory requirements. However, this research adds that decoupling practice in the OGD institutional environment stems from normative pressure.

Different organisational capabilities in the OGD are linked to the various resources levels of organisations. Thus, government organisations with better resources and capabilities are able to create value from the data. Organisational readiness depends on the industrial sector to which the organisation belongs; for example, the labour and health ministries are mature and rich in data and therefore capable of adopting OGD in advance of other departments. This research argues that encouraging a supportive environment by the regulators plays a prominent role in assisting organisations to minimise the gap in their capabilities, although this takes much time and efforts. Thus, institutional change plays a prominent role in increasing the organisations' capabilities.

6.4.4.2 Human Capital Capabilities

The degree of OGD adoption depends on the knowledge and skills level of human resources (Hossain and Chan, 2015; Zhao and Fan, 2018). This research shows that the lack of data

expertise is a barrier to the adoption of OGD. The scarcity of individual knowledge about open data is reflected at the organisation level. The human capital capabilities within government organisations represent a gap in the knowledge that represents a digital divide. The disparity in the capabilities of organisations stems from a lack of advanced analytics and data experts in the region, unable to keep abreast of new technologies such as open data. Reducing the gap in human resources capabilities requires extensive time and effort by the government organisations to increase their capabilities. The gap between organisations is reflected in their adoption levels. The early adopters, as discussed earlier, empowered with knowledgeable human resources, gain a competitive advantage by adopting OGD before the others.

The human resources gap in the OGD institutional environment varies according to the organisation's size, maturity and culture. The advantages to the early adopters effectively apply normative pressure within the institutional environment. Moreover, this research shows that although the human resources capabilities gap stems from the micro-level, its impact is felt at the national level. Similarly, Fichman and Kemerer (1999) acknowledged that knowledge barriers resulting in the assimilation gap impede the adoption of OGD in the institutional environment. That is, the adoption of OGD is not fully institutionalised for several reasons, including the organisations' inability to obtain the necessary skills and knowledge. The organisations' capabilities encompass both human capital and technology.

6.4.4.3 Technology Capabilities

There are disparities in the technology capabilities of organisations in the institutional environment, stemming from the organisations' size and industry sector. For example, the technology level and readiness in the health sector is far advanced compared to the municipal sector.

The existence of different levels of technology readiness in the public sector hinders OGD adoption at the national level. Organisations with well-structured technology are more innovative and adopt the OGD more quickly. Hossain and Chan (2015) study of Australian OGD suggests that larger organisations have advantages in terms of resources that support the initiative, agreeing with the findings of this research. However, they argue that large government organisations are less innovative in adopting technology, which is contrary to the findings of this study.

The variation in the level of technological capabilities has multiple facets in the institutional environment of OGD adoption. Infrastructure readiness is one facet of technology capability that limits government organisations from presenting the data to the public in an appropriate open data format. However, there are different opinions about infrastructure readiness at the micro-level as the country undergoes a new project, where the benefits are not realised at any level. Thus, the institutional practices at the micro-level reflect the unrealised benefits of the overall adoption of OGD at the national level. Moreover, the data shows that geographic features can obstruct connectivity and data links between dispersed remote departments in the countryside, affecting data reliability and accuracy at the national level. The logic shapes the institutional practices at micro-level and macro-level, encouraging questioning the technology capability of the country to utilise the open data at appropriate levels of quality and accuracy. Therefore, this research shows that technology capabilities impede the de-institutionalisation process of abandoning current practices and structure. Similarly, Al-Mamari *et al.* (2013) study of an eGovernment initiative in Oman acknowledges that lack of infrastructure and organisational readiness is a major obstacle to de-institutionalisation.

From the point of view of developing countries, this research argues that their technology capability is weak, with a significant technology gap between organisations within the country. The finding of Yang *et al.* (2015) empirical study in Taiwan, which is classified as a developed economy, shows technology can be an impediment in the complexity of open data initiative. However, the authors suggest that the technology is relatively easy to resolve a readiness is relatively good in developed countries. That is, technology capabilities are of different levels of importance to OGD in developing and developed countries with different weighted of capacity and complexity.

To summarise, the third competing logic, ICL, constrains OGD in achieving the national objectives, through its tangible and non-tangible aspects. The tangible aspects indicate differences between organisational capabilities in adopting OGD due to human resources and technology gaps between organisations. The non-tangible aspect is the gap between different organisations' capabilities, which affects the national OGD initiative. Reducing the gap in developing countries is more difficult than in developed countries where the capability factors differ.

6.5 Summary

This chapter first presents a revised conceptual framework of the OGD initiative. It then discusses how the relative institutional pillar of the regulative (less prominent), normative and cultural-cognitive pillars affect the institutional logics in adopting the OGD initiative. It considers how developing countries are under pressure from both international organisations and internal institutional sources to adopt OGD to facilitate transparency, accountability and create economic value.

The chapter explains that institutional acceptance is the dominant logic, influenced by strategic and operational drivers, in the institutional environment of OGD at macro-level and micro-level. Institutional acceptance logic is complemented by the subordinate corporate, professional and market logics. However, institutional roles logic hinders the OGD initiative in countries which are subject to frequent changes of government structure; this instability creates ambiguity in the roles and responsibilities at the macro-level, as is the case of Oman. Moreover, the legitimacy of regulators in the institutional environment comes from their power and authority, framed by robust laws and regulations. The absence of crucial laws such as Right to Information and Privacy acts slows the adoption and institutionalisation of the OGD initiative, decoupling the means-end and policy practices.

Ownership and control logic is a competing logic that affects OGD adoption, presenting a disconnection between the macro-level objective of achieving a transparent government and institutional practices of resistance at the micro-level. Data control and fear of losing data power influence this logic, resulting from an unstable organisational structure and incomplete legislative pillars for OGD. Institutional Capabilities is the final competing logic constraining the OGD from achieving its national objectives. It comprises tangible and non-tangible aspects. The former represent the gap between organisations' capabilities in adopting OGD through lack of human capital and the technology gap between organisations. The non-tangible aspect represents the gap between different organisation's capabilities which affect the national OGD initiative.

Chapter 7 : Conclusions

7.1 Introduction

This chapter first presents an overall summary of the research. It then highlights the contributions to institutional theory and practice. The penultimate section examines the study's limitations and opportunities for future research, and the chapter concludes with final remarks.

7.2 Research Summary

Many governments worldwide have adopted the OGD initiative at national and sub-national levels, despite several challenges to its successful adoption. This study addresses OGD adoption at the national level, examining the role of institutional logics and institutional pillars. It aims to capture the institutional logics that affect the early stage of OGD adoption at the national level in the public sector. The research goals are to investigate the institutional pillars and institutional logics that affect OGD adoption at the early stage, entailing institutional complexity that encompasses multiple government organisations with diverse structure and culture. Specifically, this research investigates OGD adoption vertically and horizontally in the public sector of the Sultanate of Oman. It argues that holistic investigations from an ecosystem perspective provide an in-depth analysis of the topic.

This research attempts to answer the question *How do institutional logics affect the emergence and adoption of the Open Government Data Initiative in the public sector?* It takes an institutional theory perspective by applying Thornton *et al.* (2012) meta-theory of institutional logics and Scott (2014) institutional pillars of institutions. Adding to the institutional theory and information systems literature, this study suggest that the institutional pillars affect the institutional logics in various levels of influences. This shows the interplay between the institutional pillars and institutional logics in the institutional environment at the macro- and micro-levels. By taking a holistic (ecosystems) perspective, the findings reveal the different levels of pressure on OGD adoption exerted by the institutional pillars. More specifically, the research concludes that regulative pillar plays a less-prominent role, unlike normative and culture-cognitive pillar. Since this study applies the interpretative research method, the pattern inducing technique is appropriate in capturing the institutional logics inductively, allowing the researcher to develop a conceptual framework (Reay and Jones, 2016). The pattern inducing technique revealed four institutional logics, one dominant and three competing logic. The *Institutional Acceptance*

Logic (IAL) is dominant in framing a wider acceptance to adopt OGD at the micro- and macro-levels, complemented by competing logics in guiding the institutional practices. The three co-existing subordinate logics hinders the OGD initiative in achieving the desired objectives of data openness. These competing logics are *Institutional Roles Logic (IRL)*, *Ownership and Control Logic (OCL)* and *Institutional Capabilities Logic (ICL).*

This thesis comprises of seven chapters. The *introductory chapter* 1 presents the research background and the research problem of OGD in Oman. It lays out the aims and objectives of the research, to address the early adoption of an OGD initiative in a developing country by identifying how the institutional logics affect the early-stage adoption of the initiative at the national level. The chapter states the research question and sub-questions in conducting the progress of the research suggested by Eisenhardt (1989), which outlines the iterative stages allowing the researcher to develop a conceptual framework for OGD adoption.

The first stage was to review the literature on OGD, described in *Chapter 2*. This chapter identifies gaps in the literature on OGD within information systems research. It first defines OGD and discusses how different OGD initiatives have evolved in the developed and developing world, highlighting the characteristics responsible for the differences between the two. It suggests that the OGD initiative has political aspects that make it different from other eTransformation initiatives. The chapter links OGD with the different facets of institutional arrangements such as laws and regulations, ownership and institutional capabilities. To the researcher's knowledge, very few studies have addressed OGD from the institutional perspective (Egger-Peitler and Polzer, 2014; van Schalkwyk *et al.*, 2015; Bentley and Chib, 2016; González-Zapata and Heeks, 2017; Kornberger *et al.*, 2017; Safarov, 2019), and empirical studies of OGD initiatives in developing countries are even limited (Davies and Perini, 2016; Canares and Shekhar, 2016), focusing on the sub-national level and the gap with the complex national level.

The theoretical foundations described in *Chapter 3* are an essential element to investigate the topic and finding appropriate explanations for its conclusions. The chapter therefore highlights institutional theory as the lens through which to study the early stage of OGD adoption. It addresses different facets of institutional theory and institutional logics and justifies their suitability for this study. The chapter also discusses the theoretical aspects of applying an early stage in information systems research, concluding with the proposed conceptual framework for the OGD initiative at the national level, derived from the institutional pillars and institutional logics.

In the interim, chapter 3 sheds light on the development of institutional theory from its inception from different social, economic and politics disciplines (Berger and Luckmann, 1967; Meyer and Rowan, 1977; Di Maggio and Powell, 1991), through the introduction of neo-institutionalism in the institutional analysis by DiMaggio and Powell (1991) and the organisational isomorphisms, coercive, mimetic and normative, that explains why a particular change occurs. The three pillars of institutions by (Scott, 2014) are illustrated with the addition of a culture-cognitive pillar that links the macro- and micro-levels in the institutional environment.

This study explored different definitions of institution, however this thesis adopt Martin (2004) definition of *institution,* defined here as Oman's government comprising different organisations of regulatory authorities and government organisations to represent the unit of analysis. Chapter 3 also discusses the theory of institutional logics in the context of the OGD initiative in Oman. Institutional logic facilitates a meta-theory that enables in-depth analysis from different perspectives at multiple levels (Thornton and Ocasio, 2008). The institutional logics emphasise the effects of different logics on the individuals and organisations at the micro- and macro-levels (Thornton and Ocasio, 2008). Institutional logics are thus an appropriate theoretical lens through which to study the OGD initiative at the national level, as the institutional environment encompasses multiple levels with diverse organisational cultures.

Other facets of institutional theory such as change, trust and complexity are explored to explain how and why institutional logics influence the practices and behaviours of the institutional environment of OGD. The chapter synthesises the literature and empirical studies that have investigated institutional logics in the information systems domain. A gap is identified in applying and capturing the institutional logics at the complex national level (Currie and Guah, 2007; Sahay *et al.*, 2010; Asangansi, 2012; Hayes *et al.*, 2014; Sandeep and Ravishankar, 2014; Reay and Jones, 2016; Bunduchi *et al.*, 2019) as it has not been studied or explored empirically in the context of the OGD initiative.

The final section of chapter 3 illustrates the initial conceptual framework of OGD adoption based on the literature reviewed and the findings of the pilot study conducted in the first phase of the study. The conceptual framework is intended to explain how and why the ideations of different logics shape the meaning of the institutional practices in the OGD institutional environment. It shows how the institutional logics operate at multiple levels

(Thornton and Ocasio, 2008), and indicates the interaction among the institutional pillars. The conceptual framework suggests that institutional practices are shaped by the institutional pillars and institutional logics, and vice versa. Moreover, the institution is susceptible to institutional change resulting from different institutional pillars and different institutional logics through space and time at the macro- and micro-levels.

Chapter 4 presents the research methodology and illustrates the methods and protocol applied in exploring the OGD phenomenon throughout the research stages. The chapter first explains the assumptions on which the research philosophy is based, and then describes the different research paradigms, approaches and strategies, justifying the selection made for this study. The qualitative interpretive paradigm with a single-case embedded study research design (Yin, 2014) is adopted as being most appropriate in this context. The institutional environment involves organisational and social aspects, making interpretivism more appropriate, facilitating an in-depth understanding of the data collected through semi-structured interviews and analysis through interpretation of the interview data (Walsham, 1993). To recap, the research design is an embedded single-case study (Yin, 2014) whose context is the Oman government at the national level, with government organisation as units of analysis.

Chapter 5 indicates how the primary and secondary data is collected, following Eisenhardt (1989) recommendations to continue the recruitment of organisations until the saturation point is reached. Data was collected in the initial stage of the pilot study to construct the original conceptual framework. Primary data was collected from face to face semi-structured interviews and focus groups, and secondary data from organisations' reports, documents, website information, newspaper articles, rules and regulations and the WhatsApp professionals group (Creswell and Creswell, 2018). The interviewees provided insightful explanations and allowed the researcher to explore in-depth their opinions and beliefs about the OGD initiative in Oman. Following the pilot study, the researcher interviewed respondents from top management, managerial and middle management and employee levels in seven government organisations at the micro-level, and from two organisations at the macro-level.

The chapter explains the pattern inducing technique (Reay and Jones, 2016) for inductively capturing institutional logics from the institutional environment, allowing the researcher to derive reasoning and logic bottom-up from beliefs and institutional practices. In order to contextualise the identification process, the researcher followed the three-tiered approach of

Gioia *et al.* (2013) as a template to analyse the data inductively. Thematic analysis using NVivo software was applied to capture the institutional pillars inductively (Saldaña, 2015). The chapter concludes with the measures applied to ensure research rigour in terms of reliability and validity.

Chapter 6 outlines the findings from the analysis of the main data collection, guided by the initial conceptual framework (Carroll & Swatman, 2000) described in Chapter 3. The analysis was carried out in two stages of the data collection, from the pilot study and the main study. It followed the techniques described in Chapter 4. The analysis revealed the institutional logics identified in the institutional environment: one dominant logic (Institutional Acceptance Logic) and three competing logics (Institutional Roles Logic, Ownership and Control Logic and Institutional Capabilities Logic), conforming to the five principles of the Institutional Logics Perspective (Thornton *et al.*, 2012).

Chapter 7 discusses the overall findings, linking them to the literature. It first explains how the institutional pillars and institutional logics affect the adoption of the OGD, and then their interplay. It revisits the conceptual framework to reflect the research findings and discussion.

The discussion revealed that the prominent institutional pillars are normative and cultural-cognitive, whereas the regulative is relatively weak. The chapter explains how IAL is influenced by strategic and operational drivers, and how and why it is complemented by the subordinate corporate, professional and market logics. The chapter then discusses how and why these competing logics frame a disconnection between the macro-level objective of achieving transparent government, and the institutional practices of resistance at the micro-level.

7.3 Research Contributions

The research aim and objectives stated in Chapter 1 were met; as Figure 7.1 shows how each was addressed and assessed throughout the research. The following sections highlight the theoretical contributions, contributions made to the information systems discipline and finally the contributions to the practice and professionals of OGD.

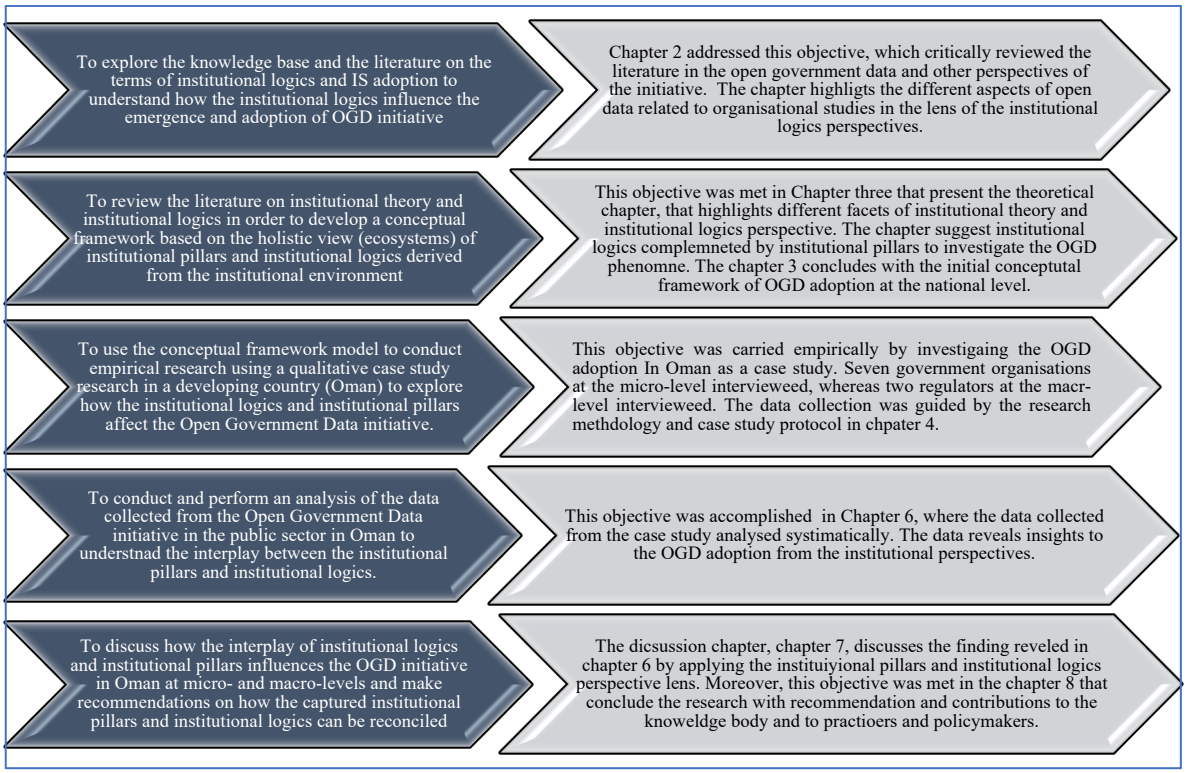

Figure 7.1 Realisation of Research Objectives

7.3.1 Contribution to Institutional Theory in Information System Literature

This section delineates the key contributions from the research findings to information systems and institutional theory. The first contribution to theory comes from the study's explanation of the role of institutional logics and institutional pillars in the complex institutional environment settings and how they affect the adoption of the OGD initiative.

The study outlines how institutional logics are shaped and reconciled in the complex environment at the national level. While recent literature addresses the institutional logic that encompasses institutional complexity in a single case study (Berente *et al.*, 2019; Burton-Jones *et al.*, 2019; Bunduchi *et al.*, 2019), this study offers a holistic view and illustrates how institutional logics interact in the complex heterogeneous institutional environment of OGD. It provides a further explanation of how institutional logics co-exist and overlap (Hayes *et al.*, 2014). Given the tensions between the dominant and competing institutional logics, this research reveals that OGD adoption progresses at a slower pace.

The literature suggests that subordinate logics always assume the role of competing logics; however, this research shows that they can act as a dominant logic, acting as an overarching logic and framed by three constitutive subordinate logics: corporate, professional and market. In addition, this research adds that the conflating institutional roles contribute

negatively to the OGD adoption in the early stage, as do the tensions between the micro- and macro-levels which elevate several competing logics in the institutional environment. The study suggests that in order to reconcile the competing logics, a combined collaborative initiative should be formed between the regulatory authorities at the national level. Collaboration would establish the appropriate legal foundations and adopt a national-level strategy for OGD.

This research provides further evidence that decoupling exists between *means-end* and *policy-practices*, negating the suggestion by Boxenbaum and Jonsson (2017) of abandoning the IS project in similar circumstances. Therefore, this research provides further explanations how the decoupling between *mean-end* doesn't affect the IS initiative in developing countries, which is mainly due to cultural factors and different settings of institutional arrangement in the institutional environment.

This research adds to the body of knowledge and addresses how the institutional pillars interacts in the complex environment. These pillars were found to have effects at different weights on macro- and micro-levels, and result from the interplay of the regulative, normative and cultural-cognitive pillars on the adoption. The recent literature suggests that institutional pillars affect the adoption of information systems (Frumkin and Galaskiewicz, 2004; Hossain and Chan, 2015; Alzadjali and Elbanna, 2019), but it is inconclusive about the different levels of pressure. This research shows that the normative and cultural-cognitive pillars are stronger than the regulative pillar, which is relatively less-prominent effect to the OGD adoption.

Institutionalists argue that the regulative pillar needs a coercive mechanism for the regulator to issue sanctions (Di Maggio and Powell, 1991; Scott, 2014). This study shows that the coercive pressure has relatively little effect when the institutional arrangements of the country are unregulated. Coercive pressures are complex in nature and can co-exist in the institutional environment with different weights of influences, under the influence of political factors (González-Zapata and Heeks, 2017).

In addition, this research shows that the normative and cultural-cognitive pillars are relatively prominent in the institutional environment of the OGD initiative; although the literature assumes that normative pressures stem from external forces (Shkabatur and Peled, 2016; Wang and Lo, 2016), this research shows that they can arise from internal or/and external pressure. Addressing the interplay of different institutional pillars, the research

argues for a relationship between the normative and cultural-cognitive pillars using a mimicking mechanism, adding that this interplay recursively shapes and influences the dominant logics, even when the de-institutionalisation stage suggested in the literature is not present (Tolbert and Zucker, 1999; Currie and Finnegan, 2011).

This study shows how institutional logics are captured qualitatively using the pattern inducing technique and three-tiered Gioia approach (Gioia *et al.*, 2013; Reay and Jones, 2016). Multiple institutional logics co-exist at in the early stage of adoption, in this case, one dominant and three competing logics. The dominant logic identified in the institutional environment relates to the consensus in fostering OGD adoption, whereas the conflicting logics relate to the institutional roles, ownership and control and the institutional capabilities.

One of the major contributions of this study is the development of a conceptual framework for early-stage OGD adoption at the national level. The conceptual framework extends our understanding of how interacting institutional logics balance the ideation and meaning that shape the institutional practices of different actors at the macro- and micro-levels. The conceptual framework emphasises the conclusions of previous studies on the effect of institutional pillars (Frumkin and Galaskiewicz, 2004; Alzadjali and Elbanna, 2019) and institutional logics (Currie and Guah, 2007; González-Zapata and Heeks, 2017; Bunduchi *et al.*, 2019; Klecun *et al.*, 2019) on IS adoption, especially adding to the body of knowledge in the largely unexplored context of developing countries.

7.3.2 Contribution to Open Government Data Research

This research contributes to OGD research as it offers in-depth understanding by identifying institutional logics that guide institutional practices at an early stage of OGD adoption; the case study addresses national-level adoption and its institutional complexities.

The literature tends to include OGD adoption within eGovernment research (Ramon Gil-Garcia *et al.*, 2007; Gil-Garcia and Sayogo, 2016; González-Zapata and Heeks, 2017), but this study distinguishes between the two. Unlike the e-transformation initiatives, the OGD adoption has a political dimension that needs to be addressed before the comprehension stage. The political dimension comes from the political will and desire to adopt and facilitate data openness to the public. This research revealed that strategic components such as organising vision are relatively less-prominent in developing countries, where disengagement occurs between the macro-level and the micro-level due to cultural aspects

and unregulated institutional arrangements. The institutional arrangements should include a designated organisation at the national level to manage the initiative as a structural element of strategy and policy.

The OGD researchers assume that the regulators are equipped with mechanisms for enforcing OGD adoption through directives. However, this research shows that regulatory legitimacy in an unregulated environment is achieved through political engagement with government organisations. Thus, this study confirms that sanctioning tools are an essential element for OGD adoption.

Countries tend to get on the bandwagon of new technology to satisfy external forces in adopting OGD. This occurs over a longer period when uncertainty in the institutional environment is high, an antecedent to technology adoption. The literature suggest that the OGD initiatives in developing countries are prone to coercive pressure from central government, local government and the public (Shkabatur and Peled, 2016; Wang and Lo, 2016; Altayar, 2018), however this study provides evidence that developing countries are subject to external coercive pressure from international organisations.

Studies of OGD in developing countries focus on the sub-national level of adoption (Canares and Shekhar, 2016) and neglect the national-level context as too complex (Fossestøl *et al.*, 2015; Davies and Perini, 2016), but this study contributes an in-depth understanding of the complexity of a national OGD initiative. The government organisations in an uncertain environment adopt a de-centralisation approach by publishing their data as first adopters to achieve competitive advantage. However, some are more comfortable with known uncertainties and do not attempt to mimic the early adopters. This is an example of a shared competing institutional logic over the dominant logic of acceptance.

The literature suggests a top-down approach in strategic management when adopting OGD (Gichoya, 2005; Pardo *et al.*, 2012). However, this research shows that hybrid strategic management, albeit with greater emphasis on the top-down approach, is a way of overcoming the closed-culture barrier (Chen *et al.*, 2006; Ho and Im, 2015). Unlike the IS top-down approach (Fathul and Maung, 2013; Hardy and Maguire, 2017; Hinings *et al.*, 2018), this research shows that the role of the institutional entrepreneur is a bottom-up approach in OGD adoption, requiring intensive interaction and collaboration at the micro-level to ensure the effectiveness of strategic management.

The findings also shed light on how developing countries differ from developed countries in terms of culture, political aspects and organisational capabilities. The study emphasises the tangible and non-tangible elements that affect OGD adoption. The tangible element is the variation in capabilities and gaps in human resources and technology between organisations; the non-tangible element is the difference in organisational capabilities.

7.3.3 Contribution to Practice

This research findings make an important contribution to the profession and practice of OGD. Many governments, especially in developing countries, struggle to achieve the desired objective of OGD, and this study offers assistance to policymakers, government organisations and OGD professionals in similar contexts. It provides useful insights and recommendations from the ecosystem perspectives.

7.3.3.1 Contribution for Policy Makers

This study's holistic view of the OGD initiative considers individual government and international organisations as well as the national level in developing countries, offering policymakers several positions from which to view OD adoption. First, the policymakers need to recognise that OGD adoption is not like other information systems. More specifically, they must anticipate the political aspects, where the strategic direction at the macro-level affects OGD adoption at the micro-level. Other national institutional arrangements may be involved. The appropriate establishment of laws and regulations enables OGD adoption to progress, so policymakers need to ensure that legislative elements such as a Right to Information Act, Privacy Act and National Data Classification are addressed during the comprehension stage.

The findings of this research will help regulators to understand the drawbacks and barriers to OGD adoption at the national level, and the need to define institutional roles, especially between regulators. Furthermore, regulatory legitimacy requires sanctioning mechanisms in place to gain the legitimacy and guide the OGD adoption in complex environment at the national level.

The conceptual framework contributes to the work of policymakers and practitioners in countries with similar contexts to consider when adopting the OGD initiative at the national level. The framework developed here provides guidelines for understanding the interplay of institutional pillars and institutional logics. It offers an insight into how the dominant and

competing logics co-exist and guide government organisations behaviours through different institutional practices; the identification of institutional practices and competing logics allows the policymakers to establish proper arrangements to guide the organisations' behaviours. Thus, policymakers should ensure effective collaboration between government organisations to reconcile the competing logics in the institutional environment.

7.3.3.2 Contribution to the Government Organisations Practitioners

This research provides different perspectives to government organisations and practitioners, which can accelerate the adoption process and minimise the barriers to OGD. Government organisations are more likely to participate in OGD at the national level if they are aware of the benefits of OD, and should be ready to follow the first wave of adopters to gain a competitive advantage from the data. The benefit realisation of open data is an important aspect for government organisation to facilitate the data openness; in particular realising the benefits of open-linked data.

This research shows that government organisations initially apply a "wait and see" policy instead of establishing data governance to ensure appropriate internal readiness before participating in the national OGD initiatives. This readiness requires structure and culture that supports the dissemination of the data throughout the organisation. Therefore, it is essential to introduce appropriate strategy in adopting OGD at the national level and sub-national level.

As suggested earlier, the collaborative environment is a contributory factor to easing conflict in the institutional environment. Therefore, government organisations are advised to collaborate with regulators and other government organisations at an early stage, to consolidate the organising vision and stabilise the initiative. This research also recommends that government organisations address organisational change management to guide the institutional practices and behaviours of different actors in the organisation.

7.4 Research Limitations

Although this research contributes to the body of knowledge in the several ways indicated, it is not without limitations, which themselves encourage future research to rectify them. First, the research data was collected through semi-structured interviews in Oman, binding the setting to similar environments in developing countries which cannot be generalised more widely (Lee and Baskerville, 2003; Yin, 2014). The use of a single case study based

on institutional theory allows only analytical generalisation from the empirical to the theoretical (Lee and Baskerville, 2003).

Second, the research was conducted to reveal the institutional logics in national OGD adoption, so the findings of this research might not be applicable to smaller or sub-national OGD initiatives. The unit of analysis is at the organisational level, and the case study was not intended to consider the influence of institutional logics on individuals.

Third, as the research was carried at the early stage of OGD adoption (Swanson and Ramiller, 2004), the findings are not necessarily applicable to other stages in the information systems cycle. Nor does the research address how institutional logics are reconciled over a longer period. Fourth, the fact that this research was carried out within a specific timeframe where shapes the interpretation of the data collected. Finally, the institutional logics captured in this research followed the pattern inducing technique (Reay and Jones, 2016) guiding the interpretation of the findings.

7.5 Future Research

This study lays the foundations for future research to rectify the limitations and complete the gaps identified here. It might be interesting to apply the findings to a different country to investigate how the institutional arrangements frame the institutional logics of OGD adoption there. Investigation of a single organisational level of analysis might also be potential.

This research explores the adoption stage, but an investigation of the implementation stage using the same methodology would enrich OGD research, particularly at the national level. Applying this methodology in a longitudinal study over a longer period might reveal how the institutional logics in the institutional environment are reconciled over time. The recommended technique for a longitudinal study is pattern deducing, to capture the institutional logics revealed by historical changes through deductive reasoning (Reay and Jones, 2016).

Although OGD research is attracting many scholars, little attention is paid to the challenges of organisational culture; examining the cultural differences between developed and developing countries and the impact on national institutional arrangements to adopt OGD could be worthwhile.

7.6 Concluding Remarks

This chapter summarised the content of each chapter of this thesis. It identified the contributions to institutional theory and IS research, and to OGD research. The contribution to practice includes recommendations for policymakers, government organisations and practitioners. The limitations of the study and potential avenues for future research are addressed.

The worldwide move to OGD is not without issues and challenges, especially in developing countries. This research is one of the first attempts to investigate the role of institutional pillars and institutional logics in the early stage of a complex OGD adoption empirically. It provides an explanation, to the world, of how institutional pillars and institutional logics affect OGD adoption at national, macro- and micro levels, indicating the interplay of institutional logics. The researcher hopes the results will contribute to the institutional theory and information systems literature, and provide policymakers and practitioners with a holistic view of OGD adoption, enabling them to reduce its challenges and achieve the desired objectives of OGD.

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Appendix A: Institutional Context of the Case Study

1. Introduction

The aim of this appendix is to provide an institutional context of the case study selected for this research, following the principle of contextualisation (Klein and Myers, 1999) to describe and reflect the research setting from the social and historical aspects of the OGD initiative in Oman.

The case study of the adoption of OGD in Oman is investigated from the perspective of early-stage adoption at the national level, encompassing macro-level and micro-level. The chapter has four main sections, section two provides a description of Oman from geographic, economic and social perspectives. The third section highlights the country's digital transformation initiative and technology readiness, and the fourth section describes the setting of the case study. The appendix concludes with a summary of the institutional context of the case study in the fifth section.

2. Profile of Oman

The Sultanate of Oman is one of the Arabian Gulf countries, located at the south-eastern corner of the Arabian Peninsula. Oman shares a border with Saudi Arabia to the west, Yemen to the south and the United Arab of Emirates to the north. Its total area is 309,500 square kilometres, making it the third-largest country in the region (OmanInfo, 2020). The political system is an absolute monarchy, with the sultan as head of state; the current ruler is Sultan Haitham bin Tarik Al-Said, who succeeded his cousin Sultan Qaboos bin Said Al-said on 11 January 2020. Oman comprises 11 governates, each with its own economic and geographical administrative role. The governates oversee 61 states, each headed by a local governor (Wali). The Council of Ministers is the executive organisation at the strategic level, assisting the Sultan with the strategic and general policy implementation of the state. The government comprises 31 ministries and several authorities under the Council of Ministers (OmanInfo, 2020).

Oman is one of the six members of the Gulf Cooperation Council (GCC) that aims to achieve unity through effective coordination, integration and inter-connection between member states in all fields (GCC, 1981). Oman was ranked 47 in the United Nations Development Program (UNDP) for 2019, which the average achievements in human development: long

and healthy life, knowledge acquisition and an adequate standard of living. Life expectancy has increased significantly since 1970 to reach 77.6 years (Oman Observer, 2020).

3. Economic Profile

Oman's economy is primarily dependent on the energy revenue that generates about 75% of the national Gross Domestic Product (GDP). The average income per capita is $37,039, with GDP growth averaging 2% annually (NCSI, 2019). Oman is rich in natural resources, especially oil and gas, and is classified by the World Bank as a high-income economy (World Bank, 2018). Nevertheless, the International Monetary Fund and the United Nations classify Oman as a developing country (International Monetary Fund, 2018). As the economy is dependent on the energy revenue, it fluctuates over time with the instability of fuel prices, affecting national development.

4. Social Profile

According to the National Centre for Statistics and Information, the total population of Oman in 2018 was 4.6 million. The expatriate population in the same year was 1.9 million, representing 41% of the total population. Females represent 45% of the total population, and Omani society is considered as young, with 85% of the population aged 45 or below (NCSI, 2019).

5. Digital Transformation

The high growth rate in terms of technology and Internet penetration is clearly recognised in Omani society. According to the National Centre for Statistics and Information, there was a significant increase between 2009 and 2018 in mobile and fixed broadband (NCSI, 2019); see Figure A.1. The increased digital penetration reflects the increased use of Information Technology (IT) and telecommunications in Omani society, and is largely attributed to government policy many of whose paper-based services have been transformed into electronic services.

His Majesty Qaboos bin Said, the late Sultan, highlighted the importance of information technology when he addressed the Oman Council in November 2008:

> We have always emphasised the importance of learning and knowledge, and we have always been open to the adoption of new developments in this field. Information and communication technology have now become the main elements that move forward the development process in this third millennium; therefore, we have accorded our

> attention to finding a national strategy to develop the skills and abilities of citizens in this domain with the aim of further developing eGovernment services. We are closely following the important steps that we have made in this regard. We call upon on all government institutions to speedily enhance their performance and to facilitate their services, by applying digital technology in order to usher the Sultanate into the constantly evolving spheres for applying knowledge. (ITA, 2015)

The government of Oman had already decided to transform the country into a digital society, embarking on an eTransformation programme in 2006 by introducing the eOman strategy. In 2006, royal decree 52/2006 promulgated on 1 June 2006 the Information Technology Authority (ITA). On 28 February 2012, the Council of Ministers directed all government organisations to initiate the eGovernment transformation programme in compliance with the eOman strategy. The Council of Ministers assigned the responsibility for implementation to the Information Technology Authority (ITA, 2015). A recent royal decree in 2019 announced a change in the status of the ITA from an authority to a ministry (MTC) (Official Gazette, 2012), referred to in this thesis as the IT regulator.

The strategy initiated by the ITA in 2006 aimed to bring the country into the digital era by adopting several eGovernment initiatives. An empirical study by Al-Mamari et al. (2013), using institutional theory, revealed that eGovernment in Oman, as in other developing countries, was motivated by international coercion, mimetic and normative pressures, as well as improving the effectiveness and efficiency of operations in government organisations. The latter could be accomplished through transparency by adopting a strategy of openness and providing information to the public through the Web (Bertot et al., 2012).

The eGovernment initiatives are evolving from being an isolated presence on the Internet to adding more technological and organisational services, related to enhancing performance and accountability. Gil-Garcia and Martinez-Moyano (2007) argue that the evolution is due to two pressures, one from public managers to solve problems and the second from different stakeholders such as citizens and businesses, to control the public managers. The pressure from the public for more transparent government escalated during the Arab Spring in 2011, which eventually motivated the government to act swiftly to promote public information sharing and enhance eGovernment initiatives. The OGD initiative is considered part of the digital transformation as its aim is to promote transparency and increase government accountability.

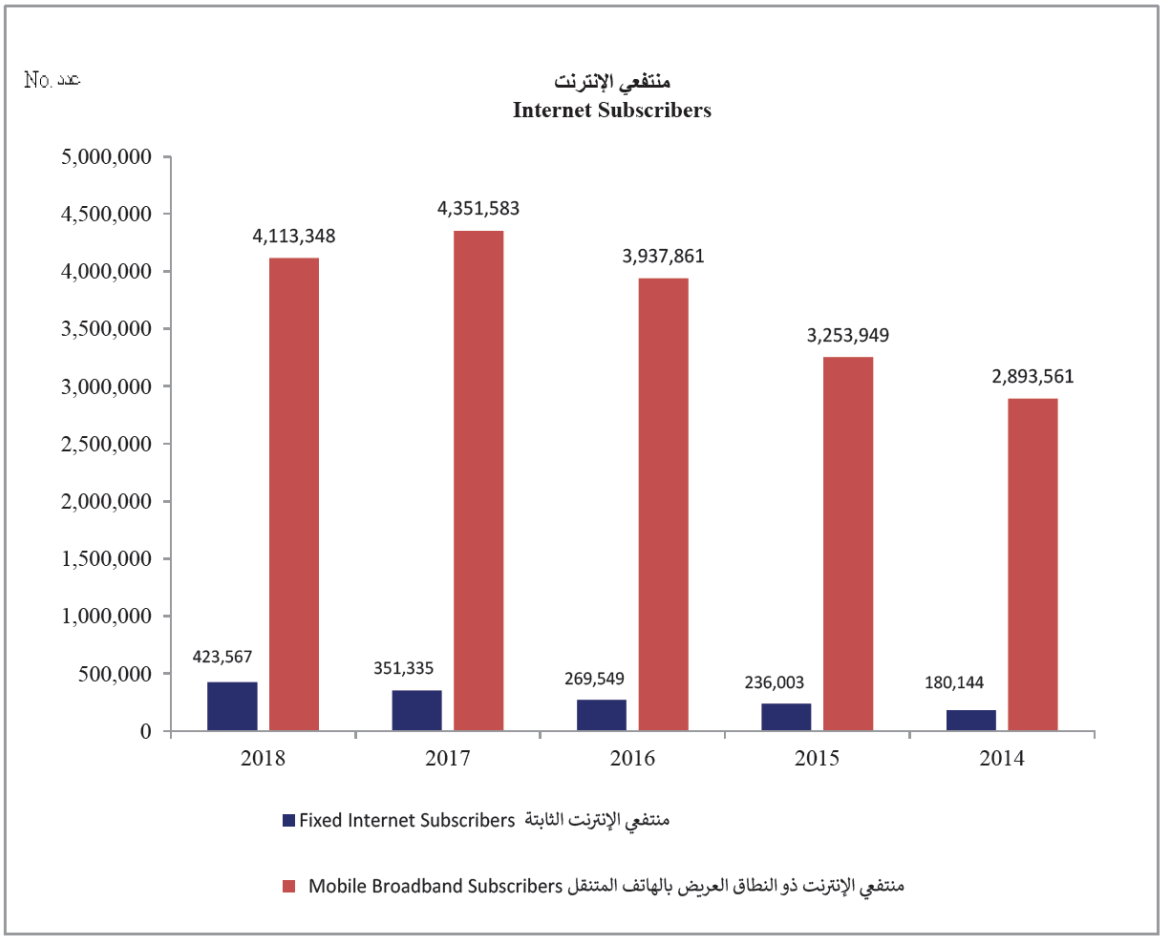


Figure A.1 Internet Subscribers in Oman - (NCSI, 2019).

6. Open Government Data Initiative

The OGD initiative was initiated in 2013 by the ITA, with the following initial objectives (Omanuna, 2015):

1. Accelerate the delivery of eGovernment services by enabling collaborative government.
2. Enable government organisations to freely share their data while avoiding duplication of published data.
3. Encourage citizen engagement by activating eParticipation to improve the quality of the public services.
4. Increase opportunities for the published data to be used creatively to build innovative applications with positive economic and social benefits to the public.

The OGD initiative aims to provide data from ministries, municipalities, and other government and semi-government entities. The focus is on providing government data from the following areas (Omanuna, 2015):

1. Constitutional data
2. Demographic data such as population, geographic divisions
3. Public finance such as income and expenditure and budgets and plan
4. Social-economic indicators
5. Healthcare data
6. Transport data such as public and private facilities, movements
7. Education data
8. Social benefits data
9. Legal data that includes laws, royal decrees, ministerial decisions
10. ICT data

7. Regulators' Roles

The governance mechanism for the OGD initiative in Oman was solely assigned to the ITA; however, in 2015, the ownership of the project moved to the NCSI. Thus, the initiative is faces several challenges to achieve its objectives for several reasons as discussed thoroughly in the next chapters. The government introduced a new governance mechanism in 2019 to segregate the roles and responsibilities of the ITA and NCSI.

The new role and responsibilities of the NCSI as the Chief Data Office (CDO) of Oman are stated as follows (Omanportal, 2019b):

1. Providing supervision over the management and organisation of statistical and information work in the Sultanate.
2. The proposal and implementation of statistical and information strategy.
3. Coordination with the state agencies in this area.
4. The collection of data for use whenever the need arises.
5. Ensuring there is harmony between the statistical and information work and the national development objectives.
6. Conducting national censuses.
7. The compilation and publishing of social, economic, environmental and cultural indicators.
8. The compilation and publishing of information and the official national statistics at both national and international levels.
9. The establishment and management of an integrated system of social and economic information at the national level to meet the various development requirements.

10. The establishment of indicators to measure the development performance in the Sultanate.

The ITA (currently MTC) is the Chief Information Office (CIO) of Oman. Its responsibilities within the OGD are to provide digital and IT resources to government organisations, and to assist them in adopting and implementing the terms of the initiative (Omanportal, 2019a). Figure A.2 shows the timeline of OGD adoption from its establishment in 2013 to date, highlighting the important events.

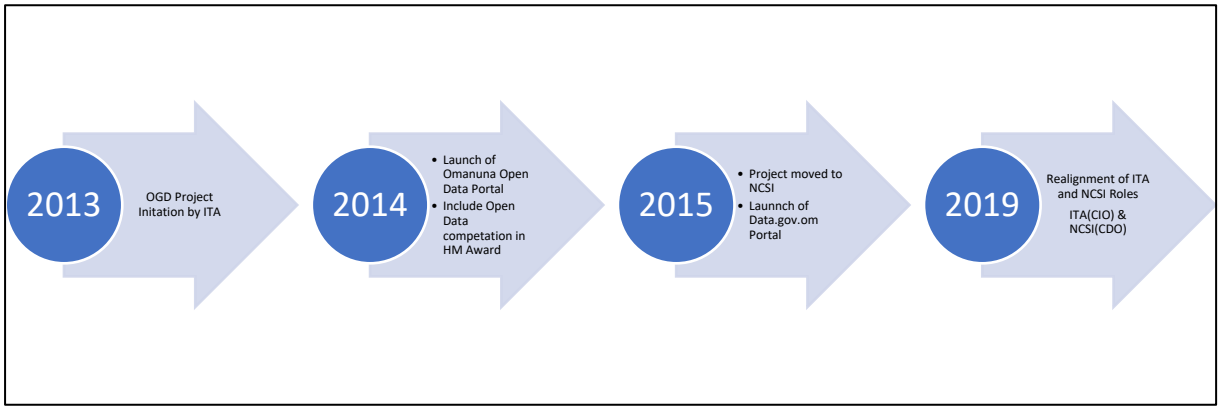


Figure A.2 Open Government Data Adoption Timeline in Oman.

The IT regulator established the OGD project as a base for all the datasets obtainable from different government organisations, under a central online portal called Omanuna (Omanuna, 2015), initiated in 2013 by the IT regulator and involving several government organisations. The project involved ten government departments in the first phase, followed by a second phase with 30 data providers from 28 sectors. The Omanuna portal hosts all government organisation data sets since the project began.

Royal decree 31/2012 promulgated the National Centre for Statistics and Information (NCSI), and royal decree 40/2014 issued the system for the NCSI (Official Gazette, 2012). This assigned the responsibility for collection and dissemination of all official data and statistics in Oman to the NCSI (Official Gazette, 2014). Prior to the establishment of NCSI, all government statistical data was produced by the Ministry of National Economy. Now responsible for all government data in Oman, NCSI launched an open data platform or portal to make the data and statistics available to the public (NCSI, 2017). A senior manager at the CDO commented on the portal:

> *We consider it open data, and we have even removed the copyright statement from the portal.* - (R07)

A senior executive supported this and said of the change in OGD ownership:

> *It is better with NCSI because NCSI has a right according to the law to speak and to ask all entities in the country.* – (R13)

The NCSI vision is to:

> Promote and support the production of all official statistics and information to the highest scientific standards, professional ethics, and international best practice and to use the latest communication tools and information technology to provide and facilitate the provision of neutral information in response to the requirements of users
>
> (NCSI, 2017).

8. Embedded Government Organisations

The OGD initiative is complex in nature as the project initiated by the ITA was to be at the national level. The initial objective was to set up a centralised mechanism to disseminate government data; however, several government organisations established open data windows with their own portals. The stakeholders in the OGD initiative are not only these organisations, but also include those with an interest in the project. The main stakeholders are therefore from Omani government organisations and regulatory bodies. Figure A.3 illustrates the organisational structure of the OGD.

The major contributors are identified by the number of data sets published and contributed to the OGD project. The level of adoption of OGD by the government organisations selected varies, offering various perspectives to the research. The following government organisations were selected:

1. Information Technology Authority (CIO).
2. National Centre for Statistics and Information (CDO).
3. Public Authority for Social Insurance.
4. Ministry of Commerce and Industry.
5. Ministry of Transport.
6. Ministry of Health.
7. Ministry of Manpower.
8. Ministry of Civil Service.
9. Muscat Municipality.

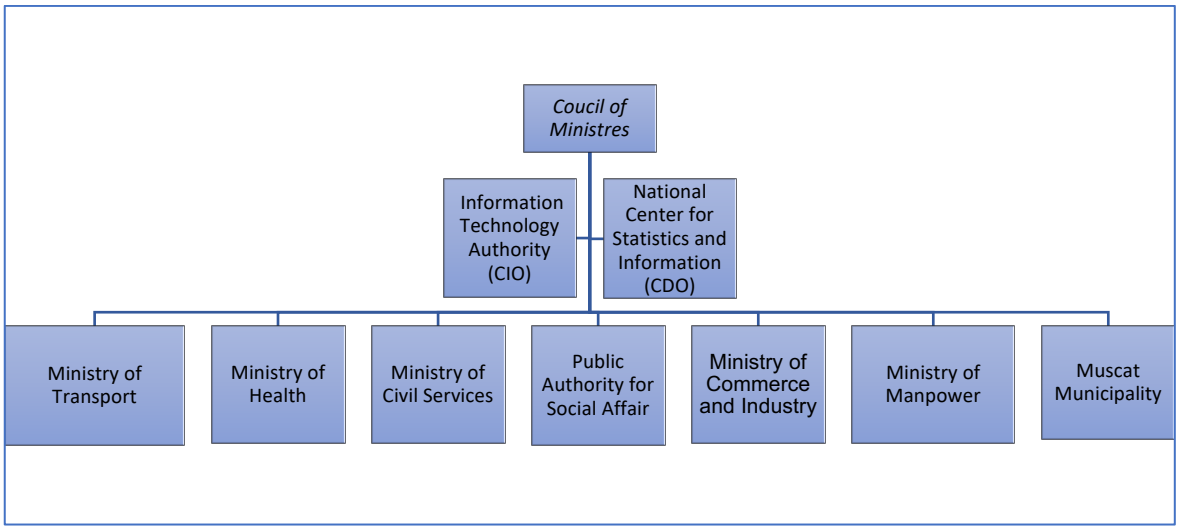


Figure A.3 Oman Government Organisation Structure of OGD

According to the central Oman portal, the government at the national level in 2015 published several data sets in the national Omanuna portal. The national portal hosted data sets from 28 sectors and 30 government organisations (Omanuna, 2015). In addition, several government organisations open their data in a decentralised approach through sub-national portals.

8.1. Ministry of Health (MoH)

The MoH is responsible for the health sector in Oman, which provides healthcare free of charge to citizens. It supervises some 81 hospitals and 268 polyclinics under the umbrella of government, and there are also 1,258 private clinics. The Ministry is one of the largest government organisations in Oman, with nearly 39,000 employees (Ministry of Health, 2018a).

The annual health report of 2018 acknowledged the health vision of 2050, which included information sharing; the report states:

> The Health Vision 2050 uses the "WHO Framework for Action on Health Systems" to describe six building blocks of the health system: leadership or governance, financing, human resources for health, service delivery, information, and medical products, vaccines and technology (Ministry of Health, 2018a,pp. 1-18).

The MoH is distinguished in eTransformation initiatives. The IT infrastructure, data richness and maturity of IT services are at a high level, and the organisation has received several awards for the excellence of its achievements (DGIT MOH, 2017). It participated in the

OGD from the beginning, and now provides a variety of datasets to the Omunana and CDO data portals, as well as publishing several datasets and statistical data in the open data window in its own domain (Ministry of Health, 2018b).

8.2. Ministry of Manpower (MoMP)

The MoMP was established in 2001 by royal decree 108/2001. It is responsible for regulating and implementing manpower policies that serve the national economy. The MoMP was a pioneer in the eTransformation programme, recognising the importance of the data to regulate the labour market. Senior management established different technologies such as Big Data, Artificial Intelligence and Open Data. In 2018 HM Sultan Qaboos presented the MoMP with the excellence award for eGovernment (Times of Oman, 2018).

The MoMP was an early adopter of the decentralised approach in publishing OGD. Its open data portal has evolved over time since 2015, and currently provides an extensive list of 56 data sets. These data sets are available in raw format that supports various open data formats. The MoMP also provides several services under the open data portal to supports citizen engagement and e-participation, innovation and e-learning. It recently launched a data hackathon to encourage the involvement of society in using the open data (Ministry of Manpower, 2020).

8.3. Ministry of Commerce and Industry (MoCI)

The MoCI regulates the private sector for its active contribution to the development of Oman's national economy. Established by royal decree 40/74, it is considered one of oldest organisations in Oman. It comprises several directorates to serve industry and investment, including the InvestEasy office, a public window for investors and the private sector. The open data portal comprises several open data sets with various file formats (Ministry of Commerce and Industry, 2020).

8.4. Ministry of Transport (MoT)

The MoT was established by royal decree 15/1973 to implement the government plan for a transport infrastructure. It supervises different sectors within the transport industry, such as ports, aviation and logistics. It did not participate in the first phase of the OGD initiative and does not publish open data to the public. However, two data sets are published under the aviation authority and NCSI portals. A few data sets about buses routes are published

by the Mwasalat company (Bus company). According to a manager in MoT, the Ministry was not invited to OGD initiative:

> *I have no idea about this initiative and there is information has been received or communicated from ITA to us* – (R08)

8.5. Ministry of Civil Service (MoCS)

The MoCS proposes policies and plans aimed at developing sections of the state's administrative apparatus covering organisational, human, procedural, legislative, and information aspects. It directs and coordinates efforts to ensure the optimal use of available human and financial resources. The MoCS did not participate in the first phase of the OGD initiative and does not publish open data to the public, except for statistical reports. According to a senior manager in MoCS, the Ministry only makes statistical reports publicly available, although it provides datasets on demand only:

> *We have two statistics reports, one mid-year and the annual report as well; we usually publish on-site, plus we have a soft copy distributed to all the civil service units* (R03).

8.6. Public Authority for Social Insurance (PASI)

PASI, established under royal decree 91/72, is responsible for providing social insurance and protection for the Omani labour force. It participated in the OGD initiative in the first phase of the Omanuna portal, although in 2018 it developed its own open data portal, with various data sets from nine databases (PASI, 2019).

8.7. Muscat Municipality (MM)

Muscat Municipality is responsible for providing services to several sectors of the Governorate of Muscat community, including health, technical, administration and finance. It is a leading organisation in providing electronic services to the public and has won several awards locally and regionally, including HM Award for Excellence in eGovernment Services for the in 2016 (Muscat Municipality, 2018a).

The MM was an early adopter of OGD, joining the initiative in 2013. It collaborates effectively with ITA and NCSI, publishing a number of data sets through Omunan and the NCSI data portal. It recognised the importance of a decentralised approach in providing open data to the public, and introduced a separate open data window with data sets from six

different databases. It provides a search facility to extract data from the databases directly (Muscat Municipality, 2018b).

9. Summary

This appendix addresses the institutional context of the case study selected for this research. It highlights the strategic location of Oman and the country's dependence on energy sources; despite its wealth as an oil producer, it is considered as a developing country. The technology penetration in Oman is considered high according to UN reports, as the country directs the revenue generated from the sale of oil and gas into building the telecommunications infrastructure of. The chapter concludes with the OGD adoption timeline at the macro- and micro-levels, and describes the OGD adoption status of the seven government organisations discussed in the case study.

Appendix B: Case Study Protocol

1. Introduction

The purpose of this document is to introduce a case study protocol which contains all the procedures to be followed during the data collection phase. The protocol was developed prior to the data collection. Yin (2009) offers the protocol as a key factor in emphasising the reliability of the case study. It is recommended to think about what data need to be collected from whom, how it will be collected and why (Miles and Huberman, 1994). Interview questions, as well as a list of required documents, were prepared (Benbasat et al., 1987).

2. Study Setting

The research goals are to investigate the internal and external institutional logics, which significantly affect the emergence and adoption of OGD initiatives in developing countries. The project is a large-scale information system initiative, at the national level in the public sector of the Sultanate of Oman. The research aims and objectives are not applicable to smaller projects.

On 28 February 2012, the *Council of Ministers* directed all government organisations to initiate the eGovernment transformation programme to comply with the eOman strategy. The regulatory body, the Information Technology Authority (ITA) was responsible for developing and implementing the eGovernment transformation plan, which includes open and big data initiatives (ITA, 2015).

The ITA established an OGD project as a base for all the data sets that can be obtained from different government organisations under a central online portal called Omanuna (Omanuna, 2015). However, another data portal **(**www.data.gov.om) was initiated recently by the National Centre for Statistics and Information (NCSI), the authority responsible for data in Oman as mandated by royal decree. Several government organisations were involved in the OGD initiative in 2011; however, ITA re-evaluated the initiative to include embedded open data in the strategic plan. The project started with ten government institutions and 50 data sets representing phase one, followed by the second phase of 15 government institutions and

300 data sets. The latest phase consists of 355 data sets and 30 government organisations from 28 sectors. Figure B.1 illustrates the government structure in Oman, with the organisations selected for this research.

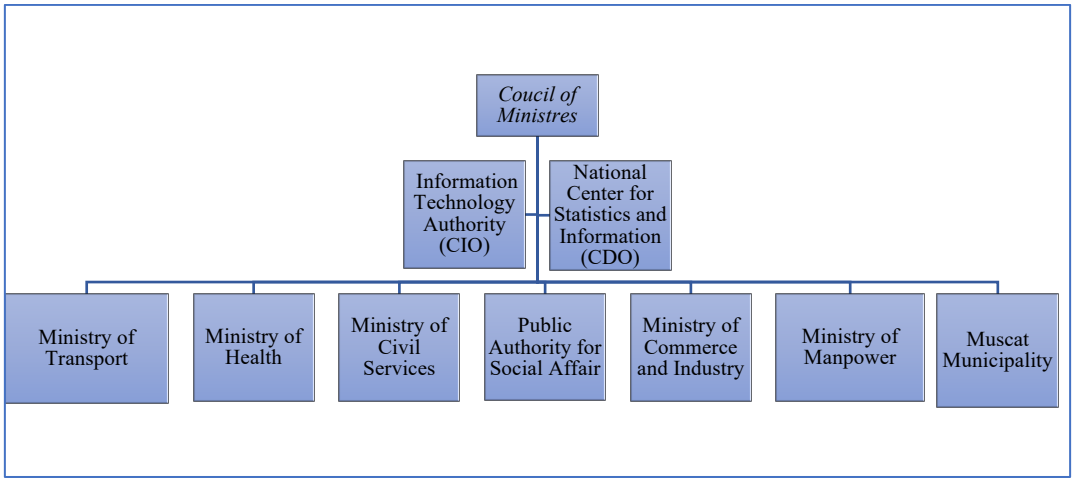


Figure B.1 Omani Government structure: organisations selected for the case study

A royal decree in the fourth quarter of 2019 promoted the ITA from authority level to ministry level, as the Ministry of Technology and Communication (MTC).

3. Study design

To achieve the aims and objectives of the research study, and based on the interpretive research paradigm, this study will follow a qualitative research approach to investigate how the institutional logics and institutional pillars affect the adoption and emergence of OGD at the early stage in a developing country, namely Oman. The target of the study is government organisations at the macro-level and micro-level. The case study selected is an embedded single-case design (Yin, 2014), involving analysis of multiple sources of evidence from seven government organisations involved in the Open Data initiative.

4. Field Methods

The following data collection methods will be used in the field:

- In-depth face to face semi-structured interviews
- Focus groups
- Various sources of secondary data such as manuals, websites, newspapers

4.1. Interviews

4.1.1. Purpose

The interview tool is considered one of the most important instruments for collecting data using the case study research design. Face to face semi-structured interview is selected as it focuses on the phenomena of the study and is expected to provide insightful explanations (Yin, 2014). This method will allow the researcher to explore the respondents' in-depth opinions and beliefs about the OGD initiative in Oman. Interview questions based on the literature review and theoretical framework that addresses the research question and sub-questions will be prepared will vary according to the different levels of interviewees in their organisations.

4.1.2. Participants

Interviewees are selected from the following positions:

- CEO and undersecretary
- Chief Information Officers (CIOs)
- IT managers
- IT senior managers
- Open Data project manager
- Policymakers
- Statistics department managers
- Users of open data from different departments
- Consultants

4.1.3. Inclusion criteria

- Key informants from macro- and micro-levels
- Involved with the OGD initiative
- Focus groups of different stakeholders
- Regulatory bodies, i.e. ITA and NCSI
- Other government organisations involved in the OGD initiative

4.1.4. Exclusion criteria

The private sector is beyond the scope of this research.

4.1.5. Sample Selection

Participants from regulatory bodies and government organisations involved in the OGD initiative will be selected using purposive sampling(Ritchie *et al.*, 2014). The rationale for this strategy is to cover the micro- and macro-levels.

4.1.6. Sample size

Table B.1 lists the distribution of the interviewees, which presents the total number of interviewees in this study from different level.

Table B.1 The distribution of the interviewees

Government Organisations	Top Management (CEO, CIO)	Managerial Level	Employee @ department level	Total
Macro-level (Regulators)				
Information Technology Authority (ITA)	1	3	1	5
National Centre for Statistics and Information (NCSI)	1	2	1	4
Micro-level				
Ministry of Civil Service (MOCS)	1	1	0	2
Public Authority for Social Insurance (PASI)	1	1	0	2
Ministry of Transport (MOT)	1	0	0	1
Ministry of Health (MOH)	1	2	0	3
Ministry of Manpower (MOMP)	2	2	2	6
Ministry of Commerce and Industry	1	1	0	2
Muscat Municipality	2	2	1	5
Total	11	14	5	30

4.1.7. Permission and invitation

Since the research involves human participation, the researcher will follow standard ethical guidelines, including informed consent, voluntary participation, confidentiality and avoidance of any adverse consequences (Miles *et al.*, 2014;

Ritchie *et al.*, 2014). All the interviewees are coded. All the research data is managed and stored securely.

4.1.8. Consent process

All the interviewees will be informed of the research purpose and objectives in advance. Moreover, the researcher will state the voluntary nature of the interview questions, and a consent form will be emailed, stating all the terms and conditions. The researcher will assure the interviewees of confidentiality and anonymity.

4.1.9. Organising the interviews

The interviews will be organised in advance, with all the participants invited separately. The location will be the interviewee's office. The interview will be one to one and face to face.

4.1.10. Introduction to the interview

At the beginning of the interview, the researcher will inform the interviewee of the overall objective, confirming the voluntary nature of the interview questions and asking for a consent form to be signed. The researcher will assure the interviewee of individual anonymity. Permission will be asked for the interview to be recorded.

4.1.11. Recording interviews

Each interview will be recorded using a digital recorder, backed up by a mobile phone. Taking notes of any non-verbal behaviour will be considered only as an option.

4.1.12. Contact summary forms

On completion of the interview, a summary will be produced. The summary report includes time and date, details about the interviewee such as name, title and role, and a brief summary of the interview highlighting any interesting points raised. The form is to be electronically typed and stored in the computer using the standard naming convention.

5. Focus Group

5.1. Purpose

The main purpose of the focus group is to reveal information additional to the individual interviews. The focus group environment allows the researcher to understand the opinions and perceptions of different stakeholder regarding. Bringing together representatives of the regulatory bodies and government departments will narrow the gap in understanding various issues from different points of view.

5.2. Participants

As the case study involves heterogeneous stakeholders, different members of different groups form the focus group, enriching the discussion with mixed opinions and responses. The target members are categorised in Table B.2.

Table B.2 Target populations

Target group	Definitions	characteristics
Regulatory Authority - IT	Information Technology Authority (ITA), responsible for the IT in Oman.	Group to be stratified by people who are involved in policymaking and also for people who are involved in the technical aspect of OGD initiative.
Regulatory Authority - Data	National Centre for Statistics and Information (NCSI), responsible for the data in Oman.	Group to be stratified by people who are involved in policymaking and data aspects of OGD initiative.
Government Organisations	Departments selected for the case study, i.e. MOH, PASI, MOMP, MOT, MOCS, MM,MOCI	Groups to be stratified by level of involvement in OGD initiative within each government organisation. Encompasses managerial level and employees at the department level.

5.3. Sample size

A minimum of two members from each target group forms the focus group, i.e. six members.

5.6. Sample Selection

Focus group membership is based on purposive sampling. Thus, each member will be selected by their level of engagement in OGD, either as manager or employee. No selection is to be made based on gender or age.

5.7. Topic guide

The discussion topic will be based on a set of characteristics related to the case study and OGD initiative in Oman. A separate agenda is to be developed to steer the discussion by the moderator (researcher).

5.8. Enrolment form

Participants will be invited to sit when they arrive at the venue. An enrolment form is to be distributed that includes basic information about the participants, such as their role, managerial level, department. Demographic information has no value within this research, and will not be collected.

5.9. Permission and invitation

Permission from the government departments and regulatory bodies is sought at least two weeks before the meeting. A formal letter from the supervisor is to be provided to accelerate the process.

5.10. Introduction and consent

The moderator (researcher) is to explain the objective of the focus group and the overall study and to ensure confidentiality and anonymity for the focus group discussion. A consent form is to be distributed to each member, and consent to be recorded using a digital recorder.

5.11. Set-up

All members will be notified in advance of the meeting venue organised by the researcher. The venue will be enclosed for privacy if possible. The most appropriate time for the discussion will be agreed with all the members. If potential participants are unable to attend on the day, this will be recorded in the study log. The researcher will be positioned within a circle of the respondents, and have access to a flip chart.

5.12. Recording interviews

A note-taking form will be used for the focus group discussions and will be completed by a separate note taker. The digital recorder will be the primary recording tool., and such mobile phones and additional recorders will be distributed through the meeting room to ensure voice clarity.

The note taker will assign an ID number to each participant to ensure proper documentation of who has contributed, and to match up with the transcript afterwards. During each focus group, the topic guide will be followed by the moderator.

5.13. Contact summary forms

A summary of the focus group discussion, highlighting interesting points raised, will be prepared.

6. Data Management and Analysis

The data handling and data entry present how the data are managed, stored during and after the data the collection. It specifies the naming convention techniques applied in this study.

6.1.File Names

Each interviewee and focus group member will be allocated a unique identifying number, written on the interview/focus group form. All files will be stored in folders named with the unique ID. For example, if ITA is coded “01” then the folder will be

saved as “drive\Phd\Data Collection\Interview\01”, and the respondent’s file saved as “R01Audioddmmyy”, where “dd” represents day , “mm” month and “yy” year.

6.2. During fieldwork

All notes and audio files will be in the custody of the researcher. Participants and non-participants will not be allowed to view the notes or any related files.Pre-determined unique identification numbers will be used on data collection forms; audio recordings will not start until the interviewee has signed a consent form. During the interview, no individual names are to be mentioned. The names of interviewees are not to be mentioned at any stage during the data collection.

6.3. After the fieldwork

After each interview, a summary report is prepared and stored on the computer using the standard naming convention. It is also entered and stored in the NVivo software for coding at the end of each day. The summary would be in English unless the interview was held in Arabic, in which case a translation is required.

All the field notes, audio files, summary forms, consent forms and any related documents collected will be securely saved in electronic format. All the relevant documents will be held on a password-protected computer which should be backed up daily with different protected storage media.

6.4. Transcription and Translation

6.4.1. Transcription

Audio recordings will be listened to using “Listen & Write” software, and a careful transcription of the interviews carried out. The transcribing of audio files will be made in Microsoft Word then translated into English if necessary. All the interviewees’ files will be exported to NVivo (QSR International) qualitative data management software for coding and analysis.

All typed records are kept on password-protected computer hard drives and a password-protected backup drive. For this study, the transcription method will reflect the interpretative approach underpinning the qualitative research, striving to convey as fully as possible the experiences and representations of the participants(Davidson, 2009). The transcription will be proof-read against the audio file by both the transcriber and

researcher to check for accuracy, to identify any missed or misheard words and to clarify any areas of confusion or unclear terminology (Witcher, 2010).

6.4.2. Translation

Any necessary translation will use the meaning-based method (Regmi *et al.*, 2010), outsourced to an external body. The translated script will be cross-checked against the original document by the researcher to ensure the correct meaning of the text. Original text will be kept and stored in a password-protected computer.

7. Data analysis

7.1. Methods

Analysis of the interview data will be carried out in two cycles. The first cycle is to establish codes and sub-codes of the interview transcriptions and to categorise them into identified groups. The second cycle is to identify patterns and themes (Miles *et al.*, 2014; Saldaña, 2015). There are three methods to capture the institutional logics, inducing pattern, deducing pattern, matching pattern (Reay and Jones, 2016). The first is the selected method to capture institutional logics and institutional pillars. It requires a substantial immersion into the data; thus, computer software, NVivo, is to be used to organise and manage the data (Silver and Lewins, 2014). This will enable the researcher to reflect continuously on the findings.

7.2. Organising the data

All the data is stored using the file names described above.

7.3. Initial coding

Initially, the primary data is to be transcribed into text format from the digital audio format, stored electronically and following the file naming convention already discussed. The second stage is to import all the audio files and the transcribed text into NVivo, for coding using inductive content analysis (Saldaña, 2015). The coding will be carried out in two cycles, first to identify possible codes and then to group relevant codes into categories.

7.4. Creating a coding template

After the initial coding has been completed on the first two to three transcripts, standard nodes and structures will be used as a basis for the next data coding. This template is embedded in the NVivo software.

7.5. Coding

The coding template will be used to continue coding the remaining transcripts, although it will be updated as new ideas, themes, and theoretical constructs emerge. Once all transcripts have been coded, the coding tree containing repeating idea nodes, theme nodes and some theoretical construct nodes will be finalised. Figure B.2 is an example of how coding techniques were applied during this study.

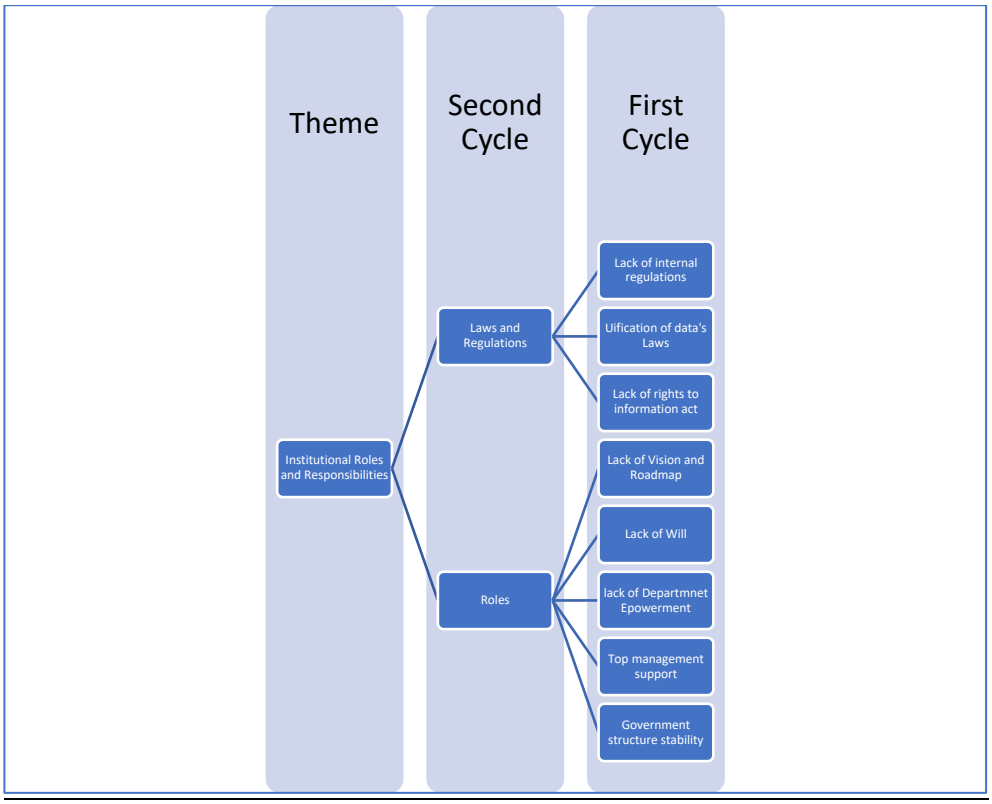


Figure B.2 Coding Techniques Applied – Sample

7.6.Development of theoretical constructs and narratives

The second cycle of the coding is to identify themes and patterns using the pattern inducing technique (Reay and Jones, 2016). The thematic analysis will also identify institutional pillars (Saldaña, 2015) using an in-depth analysis of the themes and patterns, which will update the conceptual framework developed during this study.

8. Ensuring ethics and quality in practice

Since the research involves human participation, the researcher will follow standard ethical guidelines, as already outlined. Moreover, ethic approval from the University of Reading Ethics Committee were obtained as illustrated in Appendix H.

9. Timelines

The following timelines indicate all the activities within the data collection and analysis:

- Start of the interview process.
- Start of the translation process.
- Start and finish of the first cycle of coding.
- Start and finish of the second cycle of coding.
- Completion of analysis of codes and theoretical constructs.

The details are presented in Table B.3.

Table B.3 Thesis Timeline

Dates		**Study phase**	**Activities**
From	**To**		
18 July 2016	31 July 2016	Preparation	• Contact respondents • Allocate date and time for the interview • Organise focus group venue and time
1 August 2016	1 December 2016	Data Collection	• Begin data collection • Transcribe and translate data as it is collected • Start the first cycle of coding
2 December 2016	2 February 2017	Data Analysis	• Continue coding • Develop theoretical constructs and narratives

Appendix C: Pilot Study - Interviews Questions Structures and agenda.

Theories Construct /Sub Construct	Measurement	Question(s)	Remarks
Project Status & Involvement	Ice Breaking Question	Can you brief me about your role in the Ministry?	Ice Breaking Question
	Project Status	The ministry participated in the national Open Government Data initiative in 2013. What is the status of the project at this time?	Current Project Status at the ministry. Explore the gaps between governmental agencies
		What are the key challenges in adopting Open Data initiative in Oman?	Explore Challenges
	Institutional isomorphism	What drives the ministry to implement Open Data project?	Explore institutional pressures
		How the open data add value to your organization?	Understand the values from the project
Institutional Logics			
		What are the key challenges in adopting Open Data initiative in the ministry?	Explore Challenges within organization
		In your opinion, how the technology maturity level supports open and big data project in the ministry?	Explore technology maturity level
	Institutional entrepreneur	Does the ministry higher management support the open data?	Explore the Institutional entrepreneur logic
		Are the laws and regulations allows the ministry to open its data?	Regulations and policies logic
		What are the ministry capabilities in utilizing	Explore maturity level in general: Expertise,technology,culture

		other governmental agencies data?	
		Is there any interaction between your ministry and other governmental agencies in terms of Open data ?	Explore inter-organisational interaction
	Competing logics	Within the Open data project , does the ministry have different contradicting opinions about open data?	Explore competing logics within institutional environment
Agency and Structure			
	strategies	What is the ministry strategies in sharing information exchange/Integration between governmental agencies?	Explore strategies and how it links to practices at the other levels
	Macro-Micro Linkage	How are the several departments in the ministry cooperate with the open data?	
	Complexity	How complex the open data project to your organization? In terms of stakeholders?	Explore and understand institutional complexity
	Macro-Micro	Is there any demand from the higher management for open data? How the business owner involved?	Linkage between macro and macro
	Legitimacy	How is the collaboration between the ministry and ITA and NCSI?	Legitimacy of ITA and NCSI
Institutional Change			
	Change	How open data change how your organization operate?	Explore the institutional change
		Is that change tangible at this time? In practices and norms and believes	Explore the institutional change
		How the ministry manage the change	Understand the impact of institutional change

		resulted from open data?	
		Is there any opposition for data openness and how this opposition affects the project progress?	Linkage between institutional change and competing logics
Institutional Trust			
	Trust and Organisational Trust	Does your organization trust other organization data? and why?	Explore trust issues
		Is your organization connected with other organization systems and data source ?	Explore organizational trust
		How do you describe the relationship between your organization and ITA?	
		How do you describe the relationship between your organization and NCSI?	
		Has the ITA bridge the gap between your organization and other governmental agencies in facilitating and utilizing open data?	
		What are the factors that ensure data protection and security when sharing information between inter-organizational environments?	

Appendix D: Interview Questions

Regulators

1. Can you give me a brief about your role in the organisation?
2. Do the laws and regulations allow the ministry to open its data? Is there a Right to information act?
3. What are the coordination levels, in terms of Open Government Data initiative, between your organisation and ITA and NCSI?
4. In terms of regulating Open Government Data initiative within Oman, who should be responsible for the regulations and laws? Why?
5. Have cabinet ministers instructed/advised your organisation to facilitate data openness to the public? At what level?
6. Do you have any external relationship with international organisations in relation to OD? And how does this relationship affect the Open Government Data initiative direction ?
7. Does your organisation compete with other government organisations in terms of OD or electronic services? Why?
8. Is data ownership regulated in Oman? and how does this affect the Open Government Data initiative?
9. How will opening your data affect your organisation's control of the data?
10. Will opening your data add any value to your organisation? Why? How?
11. What are the ministry's capabilities in utilising data from other government agencies?
12. Do you think the IT and technology maturity of other government organisations hinders your ministry/authority from exploiting your data?
13. Are there cultural differences between your organisation and other government organisations, in term of the use of technology?
14. What are the key challenges in the Open Government Data initiative in Oman?
15. What drives the ministry to implement Open Government Data?
16. How does open data add value to your organisation?

Government Organisations

1. Can you give me a brief about your role in the organisation?
2. Did your organisation participate in the national Open Government Data initiative in 2013? What is the status of the project at this time?
3. According to your understanding, what is Open Government Data initiative?
4. What is your role in the OGD initiative?
5. What is your vision and strategic direction about Open Government Data initiative? Is there a roadmap?
6. Do the laws and regulations allow you to open your data? Is there a Right to information act?
7. What are the coordination levels, in terms of Open Government Data initiative, between your organisation and ITA and NCSI? Has the ITA bridged the gap between your organisation and other government agencies?
8. Does your higher management support open data? Is there any demand from higher management for data openness and using open data technology and tools? How are business owners involved?
9. Within the Open Government Data project, does the management at different levels and departments have different opinions about open data?
10. Do you think ITA or NCSI has the power to force you to open your data? Why?
11. Is there any electronic interaction between your ministry and other government agencies in terms of open data? Data openness in general? Why not openly publish?
12. Has any cabinet minister instructed/advised your organisation to facilitate data openness to the public?
13. Was there any pressure from the top management or ITA to participate in the Open Government Data initiative in 2013? Why?

14. Do you have any external relationship with international organisations in relation to OD? And how would this affect your OGD direction?
15. Does your organisation compete with other government organisations in terms of OD or electronic services?
16. Do you own the data that you publish? If not, how do you manage the ownership issue?
17. Is data ownership regulated in Oman? and how does this affect the open data initiative?
18. How does opening your data affect your organisation's control of the data?
19. Is opening your data adding any value to your organisation? Why? How?
20. What are your capabilities in using data from other government agencies?
21. Do you think IT and technology maturity of other government organisations hinders you from exploiting your data?
22. Are there cultural differences between your organisation and other government organisations, in terms of the use of technology?
23. What are the factors that ensure data protection and security when sharing information in inter-organisational environments?
24. What are the key challenges in adopting the Open Government Data in Oman?
25. What drives you to implement Open Government Data?

Appendix E: Consent Form Sample

Research Ethics Committee

University of Reading

Consent Form

1. I have read and had explained to me by
Mr. Mohamed Saleh Al Farsi

the accompanying Information Sheet relating to the project on:

Open Government Data Initiatives: An Institutional Logic Perspective

2. I have had explained to me the purposes of the project and what will be required of me, and any questions I have had have been answered to my satisfaction. I agree to the arrangements described in the Information Sheet in so far as they relate to my participation.

3. I understand that participation is entirely voluntary and that I have the right to withdraw from the project any time, and that this will be without detriment.

4 In understand that this application has been reviewed by the School Research Ethics Committee and has been given a favorable ethical opinion for conduct.

4. I have had explained to me and agreed that the interview is to be recorded.

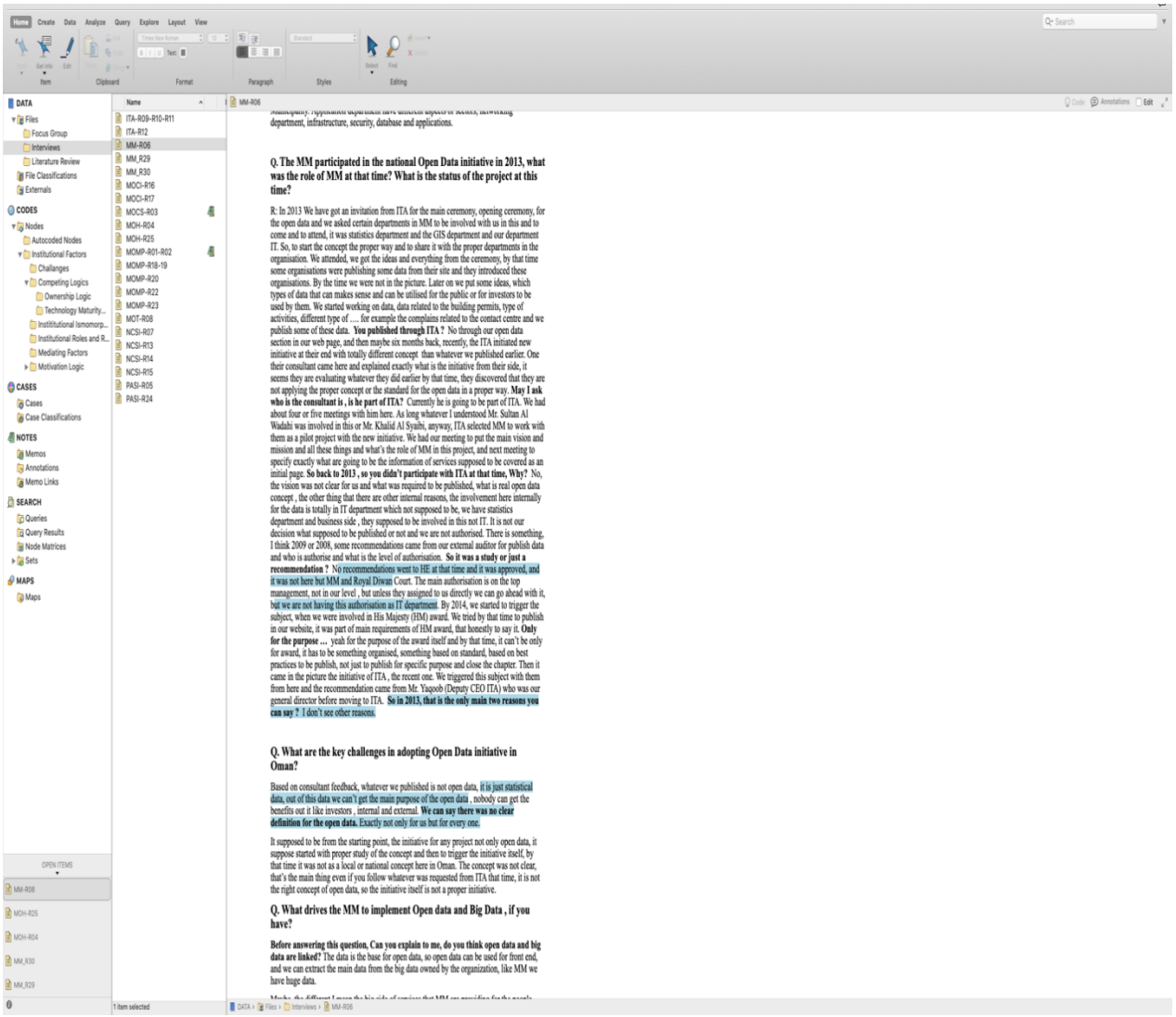
5. I have received a copy of this Consent Form and of the accompanying Information Sheet.

Name: ……

Signed: ……

Date:……

Appendix F: Sample of Nvivio Screenshots



department, infrastructure, security, database and applications.

Q. The MM participated in the national Open Data initiative in 2013, what was the role of MM at that time? What is the status of the project at this time?

R: In 2013 We have got an invitation from ITA for the main ceremony, opening ceremony, for the open data and we asked certain departments in MM to be involved with us in this and to come and to attend, it was statistics department and the GIS department and our department IT. So, to start the concept the proper way and to share it with the proper departments in the organisation. We attended, we got the ideas and everything from the ceremony, by that time some organisations were publishing some data from their site and they introduced these organisations. By the time we were not in the picture. Later on we put some ideas, which types of data that can makes sense and can be utilised for the public or for investors to be used by them. We started working on data, data related to the building permits, type of activities, different type of .... for example the complains related to the contact centre and we publish some of these data. **You published through ITA ?** No through our open data section in our web page, and then maybe six months back, recently, the ITA initiated new initiative at their end with totally different concept than whatever we published earlier. One their consultant came here and explained exactly what is the initiative from their side, it seems they are evaluating whatever they did earlier by that time, they discovered that they are not applying the proper concept or the standard for the open data in a proper way. **May I ask who is the consultant is , is he part of ITA?** Currently he is going to be part of ITA. We had about four or five meetings with him here. As long whatever I understood Mr. Sultan Al Wadahi was involved in this or Mr. Khalid Al Syaibi, anyway, ITA selected MM to work with them as a pilot project with the new initiative. We had our meeting to put the main vision and mission and all these things and what's the role of MM in this project, and next meeting to specify exactly what are going to be the information of services supposed to be covered as an initial page. **So back to 2013 , so you didn't participate with ITA at that time, Why?** No, the vision was not clear for us and what was required to be published, what is real open data concept , the other thing that there are other internal reasons, the involvement here internally for the data is totally in IT department which not supposed to be, we have statistics department and business side , they supposed to be involved in this not IT. It is not our decision what supposed to be published or not and we are not authorised. There is something, I think 2009 or 2008, some recommendations came from our external auditor for publish data and who is authorise and what is the level of authorisation. **So it was a study or just a recommendation ?** No recommendations went to HE at that time and it was approved, and it was not here but MM and Royal Diwan Court. The main authorisation is on the top management, not in our level , but unless they assigned to us directly we can go ahead with it, but we are not having this authorisation as IT department. By 2014, we started to trigger the subject, when we were involved in His Majesty (HM) award. We tried by that time to publish in our website, it was part of main requirements of HM award, that honestly to say it. **Only for the purpose ...** yeah for the purpose of the award itself and by that time, it can't be only for award, it has to be something organised, something based on standard, based on best practices to be publish, not just to publish for specific purpose and close the chapter. Then it came in the picture the initiative of ITA , the recent one. We triggered this subject with them from here and the recommendation came from Mr. Yaqoob (Deputy CEO ITA) who was our general director before moving to ITA. **So in 2013, that is the only main two reasons you can say ?** I don't see other reasons.

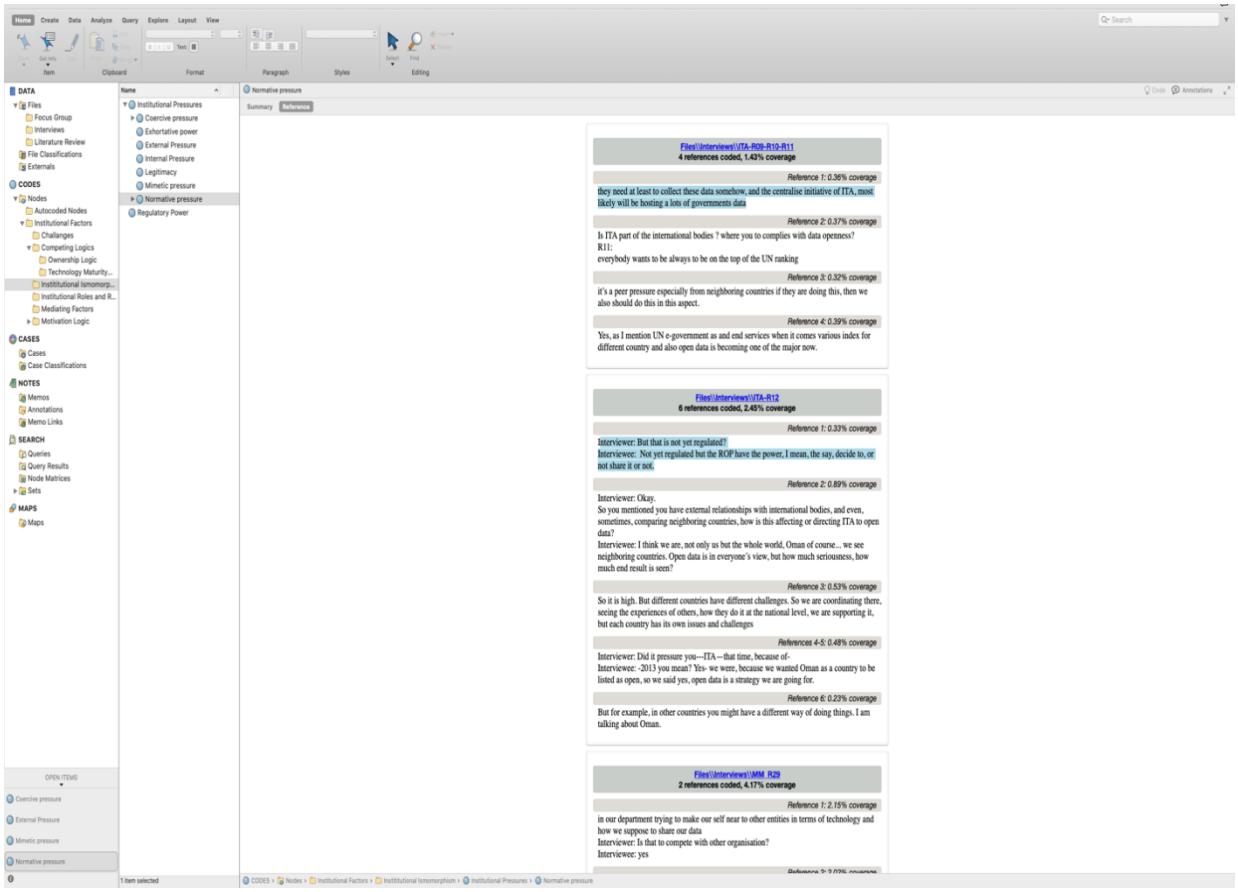
Q. What are the key challenges in adopting Open Data initiative in Oman?

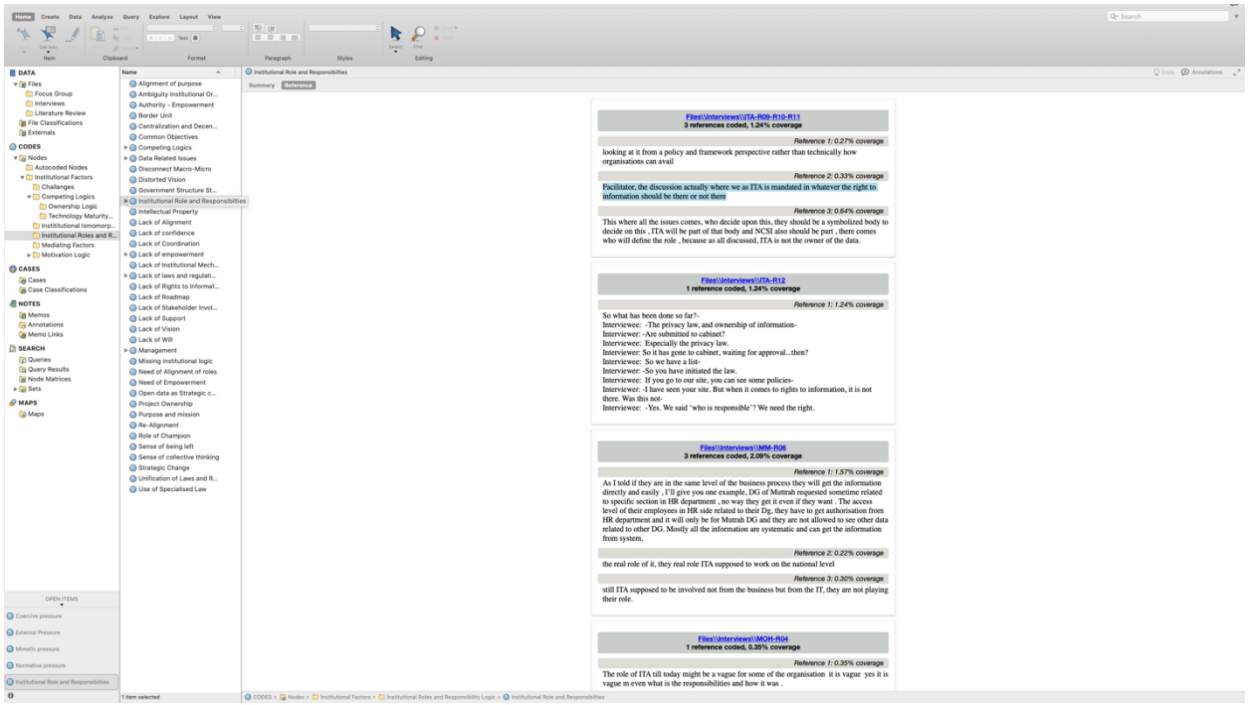
Based on consultant feedback, whatever we published is not open data, it is just statistical data, out of this data we can't get the main purpose of the open data , nobody can get the benefits out it like investors , internal and external. **We can say there was no clear definition for the open data.** Exactly not only for us but for every one.

It supposed to be from the starting point, the initiative for any project not only open data, it suppose started with proper study of the concept and then to trigger the initiative itself, by that time it was not as a local or national concept here in Oman. The concept was not clear, that's the main thing even if you follow whatever was requested from ITA that time, it is not the right concept of open data, so the initiative itself is not a proper initiative.

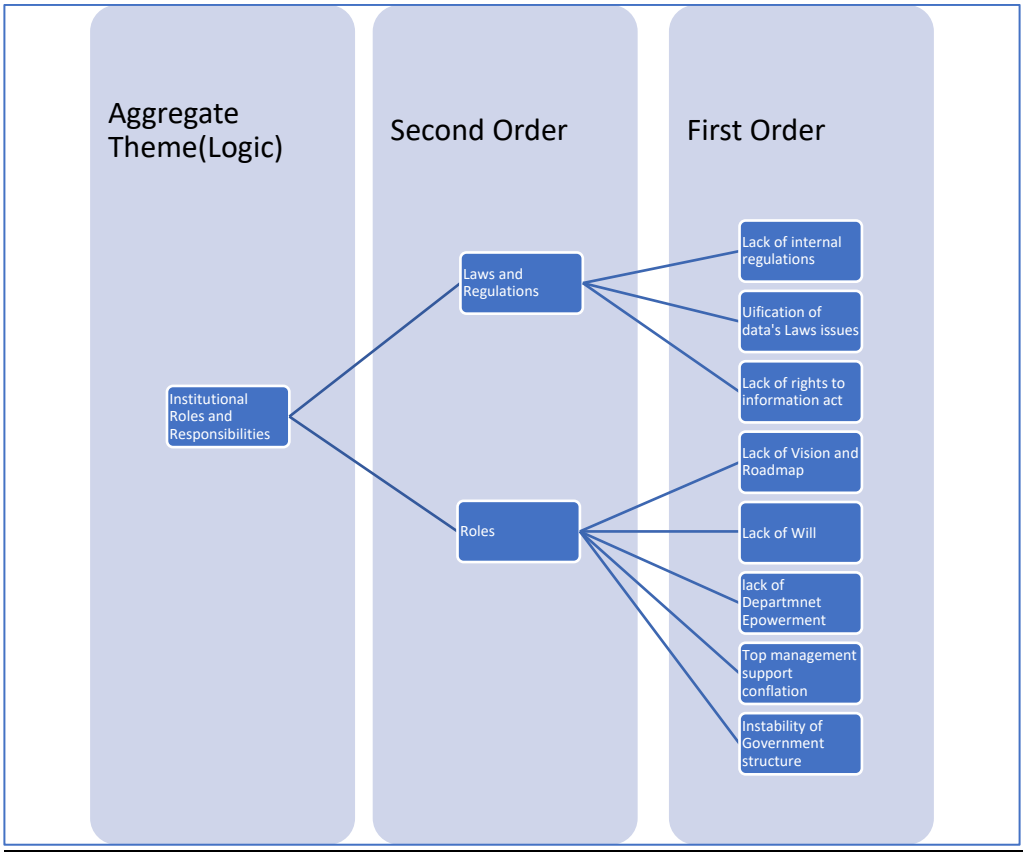
Q. What drives the MM to implement Open data and Big Data , if you have?

Before answering this question, Can you explain to me, do you think open data and big data are linked? The data is the base for open data, so open data can be used for front end, and we can extract the main data from the big data owned by the organization, like MM we have huge data.


Files\\Interviews\\ITA-R09-R10-R11
4 references coded, 1.43% coverage
Reference 1: 0.36% coverage
they need at least to collect these data somehow, and the centralise initiative of ITA, most likely will be hosting a lots of governments data
Reference 2: 0.37% coverage
Is ITA part of the international bodies ? where you to complies with data openness?
R11:
everybody wants to be always to be on the top of the UN ranking
Reference 3: 0.32% coverage
it's a peer pressure especially from neighboring countries if they are doing this, then we also should do this in this aspect.
Reference 4: 0.39% coverage
Yes, as I mention UN e-government as and end services when it comes various index for different country and also open data is becoming one of the major now.
Files\\Interviews\\ITA-R12
6 references coded, 2.45% coverage
Reference 1: 0.33% coverage
Interviewer: But that is not yet regulated?
Interviewee: Not yet regulated but the ROP have the power, I mean, the say, decide to, or not share it or not.
Reference 2: 0.89% coverage
Interviewer: Okay.
So you mentioned you have external relationships with international bodies, and even, sometimes, comparing neighboring countries, how is this affecting or directing ITA to open data?
Interviewee: I think we are, not only us but the whole world, Oman of course... we see neighboring countries. Open data is in everyone's view, but how much seriousness, how much end result is seen?
Reference 3: 0.53% coverage
So it is high. But different countries have different challenges. So we are coordinating there, seeing the experiences of others, how they do it at the national level, we are supporting it, but each country has its own issues and challenges
References 4-5: 0.48% coverage
Interviewer: Did it pressure you—ITA—that time, because of-
Interviewee: -2013 you mean? Yes- we were, because we wanted Oman as a country to be listed as open, so we said yes, open data is a strategy we are going for.
Reference 6: 0.23% coverage
But for example, in other countries you might have a different way of doing things. I am talking about Oman.
Files\\Interviews\\MM_R09
2 references coded, 4.17% coverage
Reference 1: 2.15% coverage
in our department trying to make our self near to other entities in terms of technology and how we suppose to share our data
Interviewer: Is that to compete with other organisation?
Interviewee: yes


Files\\Interviews\\ITA-R09-R10-R11
3 references coded, 1.24% coverage
Reference 1: 0.27% coverage
looking at it from a policy and framework perspective rather than technically how organisations can avail
Reference 2: 0.33% coverage
Facilitator, the discussion actually where we as ITA is mandated in whatever the right to information should be there or not there
Reference 3: 0.64% coverage
This where all the issues comes, who decide upon this, they should be a symbolized body to decide on this , ITA will be part of that body and NCSI also should be part , there comes who will define the role , because as all discussed, ITA is not the owner of the data.
Files\\Interviews\\ITA-R12
1 reference coded, 1.24% coverage
Reference 1: 1.24% coverage
So what has been done so far?-
Interviewee: -The privacy law, and ownership of information-
Interviewer: -Are submitted to cabinet?
Interviewee: Especially the privacy law.
Interviewer: So it has gone to cabinet, waiting for approval...then?
Interviewee: So we have a list-
Interviewer: -So you have initiated the law.
Interviewee: If you go to our site, you can see some policies-
Interviewer: -I have seen your site. But when it comes to rights to information, it is not there. Was this not-
Interviewee: -Yes. We said 'who is responsible'? We need the right.
Files\\Interviews\\MM-R06
3 references coded, 2.09% coverage
Reference 1: 1.57% coverage
As I told if they are in the same level of the business process they will get the information directly and easily , I'll give you one example, DG of Muttrah requested sometime related to specific section in HR department , no way they get it even if they want . The access level of their employees in HR side related to their Dg, they have to get authorisation from HR department and it will only be for Mutrah DG and they are not allowed to see other data related to other DG. Mostly all the information are systematic and can get the information from system.
Reference 2: 0.22% coverage
the real role of it, they real role ITA supposed to work on the national level
Reference 3: 0.30% coverage
still ITA supposed to be involved not from the business but from the IT, they are not playing their role.
Files\\Interviews\\MOH-R04
1 reference coded, 0.35% coverage
Reference 1: 0.35% coverage
The role of ITA till today might be a vague for some of the organisation it is vague yes it is vague m even what is the responsibilities and how it was .

Appendix G: Gioia Template Sample



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Appendix H: Ethical Committee Approval

1. Project details

Date of submission Dec 2017 Student No (if applicable) 22848565

Title of Proposed Project:-
Institutional Factors on Open and Big Data initiatives at Public Sector in Developing countries; An Institutional Perspective

Responsible Persons

Name & email address of principal researcher/student/programme member (*delete as appropriate*)
MOHAMED SALEH AL FARSI
m.s.a.alfarsi@pgr.reading.ac.uk Date:- 18/01/2018

Name and email address of supervisor (*if applicable*)
Dr. Daniel Goozman
~~daniel.goozman~~ d.goozman@henley.ac.uk

Nature of Project (mark with a 'x' as appropriate)

Staff research	☐	Masters	☐
Undergraduate	☐	Doctoral	☑
MBA	☐	Other	☐

(**Student research projects** should be signed off in **section 2. 3** below by the supervisor)
(**Staff research projects** should be signed off in **section 2.** 4 below by the Research Ethics Committee)

Brief Summary of Proposed Project and Research Methods

The aim of the projects is to identify institutional factors in open and Big Data initatives in Public Sector. The Project is to emphasis on Omani intiative o. open and Big Data. The methodology selected is single-embeded case study whic use National level as unit level of analysis. This comprise Subunit of five governmental agencies in Oman. The Data is to be collected using Semi-Structured Interviews.

☑ I confirm that where appropriate an information sheet and consent form has been prepared and will be made available to all participants. This contains details of the project, contact details for the principal researcher and advises subjects that their privacy will be protected and that their participation is voluntary and that they may withdraw at any time without reason.

☑ I confirm that research instruments (questionnaires, interview guides, etc) have been reviewed against the policies and criteria noted in The University Research Ethics Committee Notes for Guidance. Information obtained will be safeguarded and personal privacy and commercial confidentiality will be strictly observed.

☑ I confirm that **any** related documents which would include any questionnaires, interview schedules etc, and, where appropriate, a copy of the **Information Sheet**, **Consent Form** are attached and submitted with this application.

2. School Research Ethics Committee Decision (*delete as appropriate*)

2.1 I have reviewed this application as **APPROVED** and confirm that it is consistent with the requirements of the University Research Ethics Committee procedures

2.2 This proposal is **NOT APPROVED** and is returned to the applicant for further consideration and/or submission to the University Research Ethics Committee

2. 3. For student and programme member projects

SUPERVISOR – AT START OF PROJECT	**STUDENT – ON COMPLETION OF PROJECT**
18/01/18 Date:-	Date:-
Signed (Supervisor) & Print Name (*before start of project*) D Goozman	Signed (programme member or student) & Print Name (*on completion of project*)

2. 4. For staff research projects

Signed:

(School Research Ethics Committee Chair or member)

COMMENTS (where application has been refused)