

OPEN GOVERNMENT DATA ADOPTION MODEL FOR PUBLIC SECTOR  
ORGANIZATIONS IN PAKISTAN

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## **DEDICATION**

This thesis is dedicated to my father (late), who taught me that the best kind of knowledge to have is that which is learned for its own sake. It is also dedicated to my mother, who taught me that even the largest task could be accomplished if it is done one step at a time.

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## ABSTRACT

Open government data (OGD) is an integral part of open government policies and is referred to as making any public sector data and information available in formats and ways that enable free access, use and distribution and facilitate exploitation. OGD bears a pivotal role and a new way of increasing transparency and accountability, counteracting corruption, stimulating innovation and economic growth, facilitating participation and collaboration and improving services. Further, it is vital means of achieving sustainable development goals (SDGs). Despite these motivations, there is very limited OGD among public sector organizations in Pakistan which is affected by several technological, organizational, and environmental factors. Besides, the lack of a theoretical model for determining OGD adoption in Pakistan's public sector is recognized as the main gap. Therefore, the primary objective of this study is to develop and test the OGD adoption model for public sector organizations in Pakistan. A quantitative research method was adopted to accomplish the primary research objective. The data from 249 decision-makers of public sector organizations were collected through a survey method using judgment sampling, a purposive sampling technique. Data analysis was carried out using descriptive statistics in SPSS 25.0 and regression in Partial Least Squares-Structural Equation Modelling (PLS-SEM) using SmartPLS (version 3.3.3). Results revealed that data resource, dataset quality, perceived benefits, data-driven culture, digitization capacity, need for transparency, compliance pressure, and civil society participation were the factors that influence OGD adoption intention. Further, the organization's OGD adoption intention leads to influence the OGD adoption positively. However, centralization did not influence the intention to adopt the OGD of public sector organizations in Pakistan. The total variance of 59.1% is explained by various factors for adoption intention, whereas 61% variance is explained by adoption intention for OGD adoption. Theoretically, this study validates the TOE (technology, organization, environment) framework in the context of OGD adoption with adoption intention as a significant positive factor of OGD adoption. Practically, the study suggests considering data resources, dataset quality, perceived benefits, need for transparency, and compliance pressure by the government, policy practitioners, and public sector organizations for increasing adoption of OGD on a large scale among public sector organizations in Pakistan. Future studies should conduct multi-group analysis on different demographic characteristics like crises and emergencies (COVID-19), organization size, and officers appointed for OGD tasks in organizations and organizations that have e- government/OGD platforms or not. Further, future scholars should investigate the inter- relationships between technological, organizational, and environmental factors.

## ABSTRAK

Data terbuka kerajaan (OGD) adalah sebahagian dari dasar terbuka kerajaan dan dirujuk sebagai membuat data dan maklumat sektor awam dalam format dan cara yang membolehkan akses, penggunaan dan pengedaran data secara percuma. OGD berperanan penting di mana ia adalah satu cara baru untuk meningkatkan ketelusan dan kebertanggungjawaban, memerangi rasuah, merangsang inovasi dan pertumbuhan ekonomi, memudahkan penyertaan dan kolaborasi, serta meningkatkan perkhidmatan. Tambahan pula, kaedah ini penting untuk mencapai matlamat pembangunan lestari (SDG). Namun begitu, pelaksanaan OGD di kalangan organisasi sektor awam di Pakistan sangat terhad, yang dipengaruhi oleh beberapa faktor teknologi, organisasi, dan persekitaran. Selain itu, model teori yang terhad untuk menentukan penggunaan OGD di sektor awam Pakistan diakui sebagai jurang utama. Oleh yang demikian, memahami faktor-faktor yang menyebabkan penggunaan OGD adalah sangat penting bagi merealisasikan penggunaannya dalam organisasi sektor awam di Pakistan secara besar-besaran. Dengan itu, objektif utama kajian ini adalah untuk memahami dengan lebih baik bagaimana merealisasikan penggunaan OGD di kalangan organisasi sektor awam di Pakistan. Bagi mencapai objektif penyelidikan utama, kaedah kuantitatif digunakan. Data dari 249 pembuat keputusan dikumpulkan dari organisasi sektor awam di Pakistan melalui kaedah soal-selidik menggunakan pengambilan sampel, teknik persampelan bertujuan. Analisis data dilakukan dengan menggunakan statistik deskriptif dalam SPSS 25.0 dan regresi (PLS-SEM) menggunakan SmartPLS (versi 3.3.3). Hasil kajian menunjukkan bahawa sumber data, kualiti dataset, manfaat yang diperolehi, pembudayaan data, kapasiti pendigitalan, keperluan ketelusan, tekanan kepatuhan, dan penyertaan masyarakat awam adalah faktor yang mempengaruhi hasrat penggunaan OGD. Selanjutnya, hasrat penggunaan OGD organisasi ini membawa pengaruh terhadap penggunaan OGD secara positif. Namun, faktor pemusatan tidak mempengaruhi niat untuk menggunakan OGD organisasi sektor awam di Pakistan. Variasi keseluruhan sebanyak 59.1% dijelaskan oleh pelbagai faktor untuk hasrat penggunaan OGD, sedangkan varians 61% dijelaskan oleh hasrat penggunaan OGD untuk penggunaan OGD. Secara teorinya, kajian ini mengesahkan rangka kerja TOE (teknologi, organisasi, persekitaran) dalam konteks penerimaan OGD dengan niat pakai sebagai faktor positif yang signifikan terhadap penggunaan OGD. Secara praktikal, kajian ini menghuraikan beberapa faktor yang perlu disarankan kepada kerajaan, pengamal dasar, dan organisasi sektor awam untuk merealisasikan OGD secara besar-besaran di kalangan organisasi sektor awam di Pakistan. Kajian seterusnya harus melihat aspek analisis multi-kumpulan berdasarkan ciri demografi yang berbeza seperti krisis dan darurat (COVID-19), saiz organisasi, pegawai yang dilantik untuk tugas OGD dalam organisasi, dan organisasi yang mempunyai platform e-kerajaan/OGD ataupun tidak. Selanjutnya, sarjana masa depan harus menyiasat hubungan antara faktor teknologi, organisasi dan persekitaran.

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## LIST OF ABBREVIATIONS

API	-	Application Programming Interface
AVE	-	Average Variance Extracted
CEO	-	Chief Executive Officer
CKAN	-	Comprehensive Kerbal Archive Network
CSV	-	Comma-Separated Values
DKAN	-	Drupal-based Knowledge Archive Network
DOI	-	Diffusion of Innovation
FoI	-	Freedom of Information
GOP	-	Government of Pakistan
ICT	-	Information and Communication Technology
IS	-	Information System
IT	-	Information Technology
IT/IS	-	Information Technology/Information System
ITs/ISs	-	Information Technologies/Information Systems
JSON	-	JavaScript Objective Notation
NGO	-	Non-Government Organizations
ODB	-	OpenData Barometer
OGD	-	Open Government Data
OKFN	-	Open Knowledge Foundation
PLS	-	Partial Least Squares
SDPI	-	Sustainable Development Policy Institute
SEM	-	Structural Equation Modelling
SLR	-	Systematic Literature Review
SPSS	-	Statistical Package for the Social Sciences
TOE	-	Technology, Organization, Environment
UK	-	United Kingdom
UN	-	United Nations
USA	-	United States of America
UTAUT	-	Unified Theory of Acceptance and Use of Technology

## LIST OF SYMBOLS

$\beta$	-	Path Coefficient
%	-	Percentage
$\leq$	-	Less than or equal to
$<$	-	Less than
$>$	-	Greater than

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# CHAPTER 1

## INTRODUCTION

### 1.1 Introduction

Open data refers to data that can be freely accessed, used, modified, and shared by anyone for any purpose (de Juana-Espinosa and Luján-Mora, 2019). Open data in organizations has become an essential policy around the world (Yang *et al.*, 2015) in the era where advancements in information and communication technologies (ICTs) are rapidly up-taking. Through open data policy, private, research, and government data can be released. Upon opening the private data, organizations can reach and interact with their customers better as the stakeholders can develop applications through mash-ups and visualizations (Hossain *et al.*, 2016). Besides, research data is imperative to speed-up research activities, test novel hypotheses, validate research results, and long-term preservation of research outputs (Zuiderwijk and Spiers, 2019). Further, an open data policy is essential to ensuring accountability and delivery of quality services, cost reduction in operations, and stimulating innovations (Zeleti and Ojo, 2017). It is also crucial since it ensures the availability of government information in the long run for creating transparency, which will enable the public's right to access information (Charalabidis *et al.*, 2018a).

The public service stakeholders are some of the largest creators, collectors, and users of public data related to varied domains such as traffic, disaster, education, health, and Finance (Ponce and Ponce Rodriguez, 2020; Zhenbin *et al.*, 2019). The data from these governmental entities are argued to be set free provided that it will not breach any data protection law or other regulations (Kleiman *et al.*, 2020a). However, in agreement with Wirtz *et al.* (2016), Wang and Lo (2016), de Juana-Espinosa and Luján-Mora (2019), and Kleiman *et al.* (2020a), open government data

(OGD) in this study is referred to as making any public sector data and information available in formats and ways that enable free access, use and distribution and facilitate exploitation. The data resources are considered the nuts and bolts for gaining knowledge and producing services (Hossain *et al.*, 2016), legislation development, and increasing transparency and counteracting corruption (Zuiderwijk *et al.*, 2018a). The importance of OGD for improving economic growth, transparency, and accountability in organizations has been recognized and extensively discussed by numerous researchers (Agrawal *et al.*, 2014; Luna-Reyes and Najafabadi, 2019; Zuiderwijk *et al.*, 2018a). In this connection, OGD has emerged as an instrument to meet the objectives of e-government, such as transparency, participation, and collaboration (Wang and Shepherd, 2019). Further, government organizations and departments collect the data for decision-making and policy development (Kleiman *et al.*, 2020a).

OGD plays a pivotal role in achieving varied political, economic, operational, social, and technical objectives (Zuiderwijk *et al.*, 2018a). It is a new way of achieving these objectives. The proactive disclosure of government data has its most direct impact on government-related access to information since it immediately affects the re-utilization of government data (Attard *et al.*, 2015). According to the United Nations' report, OGD is vital for achieving sustainable development goals, 2030 (UN, 2018). The openly released government data is the core building block in smart cities' governance (Safarov, 2018) and democratic and sustainable society (Wang and Shepherd, 2019). OGD is an important innovation because it not only supports the institutions or public officials to be accountable (Huang *et al.*, 2020; Safarov, 2018) but also contributes to building trust in government institutions (González-Gallego *et al.*, 2019). OGD is expected to enable economic growth by creating new jobs, the business market, and costing savings in government (Wang and Shepherd, 2019). The free released government data in machine-readable formats also help in enhancing political prediction outcomes, commercial research, evidence-based decision-making (Florès, 2018), and improving service delivery in the public sector to attain sustainable developments (UN, 2018). Availability of government data openly is imperative to offer new dimensions and create new knowledge, which leads to effective data-driven or evidence-based decision-making by the government (Hannila *et al.*, 2019). Public service innovation is expected to be

stimulated by significantly reducing the data entry costs for individuals and business organizations, who want to develop new services from data, while government data is shared openly to the public (Wang and Shepherd, 2019). Thus, OGD is imperative and a revolutionary initiative within the electronic government centrally not only around technologies but also the data and people.

## **1.2 OGD Adoption: An innovation perspective and issues**

OGD can be regarded as a process that is to be implanted in and amalgamated with the prevailing bureaucratic structure of public sector organizations to achieve open government principles (Yang and Wu, 2016a). It can be considered a technology or service because innovation can be equal to technology or service (Yang and Wu, 2016a), which is utilized to achieve the assigned goal(s) using the Internet, software, hardware, and information technology platforms (Wang and Lo, 2016). In a study conducted by Ruijter and Meijer (2019), OGD is treated as an innovation process that takes place with regards to changes in the external environment and is originated in internal organizational choices. In another study, OGD was viewed as a form of cross-boundary information sharing and thus can be referred to from previous studies on cross-boundary information sharing among government departments. However, OGD is regarded as an innovation in this study, for examining OGD adoption, based on the conceptualization of innovation diffusion theory developed by Rogers (2003). According to Rogers (2003), innovation is an idea, practice, object, process, or anything that is new to others, whether they are individuals or organizations (Wang and Lo, 2016; Yang and Wu, 2016a).

OGD innovation requires the up-front cost of resources and investments (Ma and Lam, 2019). It also demands a significant departure from established organizational routines (Grimmelikhuijsen and Feeney, 2017). OGD qualifies as a type of innovation because it entails a departure from a more traditional logic of providing the data to online provision of data (Grimmelikhuijsen and Feeney, 2017) and a significant change from the conventional system (Huang *et al.*, 2017). Based on these facts, OGD is regarded as an innovation to the potential adopters that are

public sector organizations of Pakistan in this study. Further, there is also a need to establish its validity and formality within public sector organizations of Pakistan, as Yang and Wu (2016a) state that innovation is to establish the validity of formality of new things.

Despite considerable attention in the literature, OGD's adoption suffers from several problems to reach its full potential (Huang *et al.*, 2017; Ma and Lam, 2019; Wang *et al.*, 2019). Organizations react to environmental pressures (Grimmelikhuijsen and Feeney, 2017), such as pressure from international organizations or other countries (Roa *et al.*, 2020), higher-level organizations (Wang and Lo, 2016), demand for data from the public (Fan and Zhao, 2017). The data is publicized when public sector organizations find it useful in increasing their operational performance, efficiency, and effectiveness (Yang and Wu, 2016a). The OGD is adopted where organizations perceive it as less complicated and more compatible than their existing traditional system (Adnan *et al.*, 2019; Haini *et al.*, 2019; Janssen *et al.*, 2012). Another explanation that affects the OGD adoption is the commitment from political leaders (Ruvalcaba-Gomez *et al.*, 2020) and top-management (Hossain and Chan, 2015; Kim and Eom, 2019; Yang and Wu, 2020). Clear and established legislation, policy guidance, and licensing frameworks to influence the public sector organizations to open the data (Parung *et al.*, 2018; Yang and Wu, 2020). Other factors like risk perceptions of public officials, hierarchical barriers, and bureaucratic decision culture generate public officials' resistance within public sector organizations (Wirtz *et al.*, 2016).

Most public sector organizations are affected by the quality of data, which is the recurring problem in the current literature at the pre-adoption and adoption stages and the post-adoption phase (Roa *et al.*, 2019). However, the characteristics related to the quality of data are not few, such as data format that does not comply with the well-known standard and metadata nonexistence are associated with compliance and understanding characteristics of data quality (Vetrò *et al.*, 2016). Other quality issues are ambiguity, representation (Roa *et al.*, 2019), redundancy, and invalidity (Hossain *et al.*, 2016). However, debates regarding data quality issues within open data in the public sector organizations are prevailing.

Understanding the factors that cause the adoption of OGD is critical to determine its adoption widely. One of the common factors critical for OGD to uptake is that the lack of inter-organizational collaborations since organizations belong to different domains and working in different environments cannot collaborate and interact to disclose data openly (Roa *et al.*, 2019). The lack of involvement of decision-making authorities in the public sector organizations is also regarded as an issue since they oppose, neglect, or do not put substantial resources and required efforts to open the data (Yang *et al.*, 2015). Further, the public sector organizations cannot re-organize the institutional structure since organizational employees' tasks are already defined or do not have clearly defined responsibilities required for performing publishing data (Attard *et al.*, 2015). Another critical factor is the lack of appropriate civil servants' training and skills in publishing the data (Crusoe and Melin, 2018; Sussha *et al.*, 2015). Since difficulties are also associated with adopting OGD, complexity is regarded as a daunting factor by the earlier researchers (Haini *et al.*, 2020; Haini *et al.*, 2019; Janssen *et al.*, 2012). Legacy information systems within the public sector organizations restrict or make it complicated to publicize the data (Janssen *et al.*, 2012). However, technical problems are not limited to these concerns only. Still, these also include unavailability of supporting information technology infrastructure, lack of well-defined format for ease of data access, lack of standard software for processing of data, difficulties in using governmental platforms or no centralized data portal on the government side (Choi, 2017; Fan and Zhao, 2017; Grimmelikhuijsen and Feeney, 2017; Parung *et al.*, 2018), data accessibility and interoperability (Sussha *et al.*, 2015), data computerization and storage in isolated systems (Abbas *et al.*, 2019).

Impediments are also concerned with policy and legal aspects (Hardy and Maurushat, 2017; Huang *et al.*, 2017; Ma and Lam, 2019; Parung *et al.*, 2018; Sussha *et al.*, 2015). The public sector organizations may consider it problematic to publish data openly due to varying grades of open data licenses as they enable restrictions on being merged for a specific purpose of use (Crusoe and Melin, 2018; Khayyat and Bannister, 2015; Zuiderwijk and Janssen, 2014). Even though different legal frameworks exist, like freedom of information, the lack of clear OGD policies and regulations is addressed by Huang *et al.* (2017) and Shao and Saxena (2018). Public

sector organizations are much dependent on strong impetus or expectancy from the government; thus, a lack of government mandates hinders the OGD development (Cahlikova and Mabillard, 2019). Further, mimetic barriers such as lack of experiences or success stories from other public sector organizations in the same country negatively influence on OGD initiative (Roa *et al.*, 2020).

The term open data might seem to be unfamiliarized by the public entities since they have been involved in delivering reports in the past, whereas the provision of data in the present in its raw format might be a daunting task for them and not be clearly understood (Attard *et al.*, 2015; Ganapati and Reddick, 2012). They might also not have awareness, understanding, knowledge, or incentives of sharing open data (Shao and Saxena, 2018; Zhao and Fan, 2018). Resistance from the individuals within the public sector organizations is also addressed in earlier researches, which can significantly slow down the progress as they do not see the value of OGD (Cranefield *et al.*, 2014). Civil servants resist on OGD initiative due to certain issues. They may perceive it as they are accountable to the public (Kleiman *et al.*, 2020a). As a result, these perceptions lead to unexpected outcomes (Huang *et al.*, 2020). Due to cognitive barriers of administrative employees within public sector organizations, the OGD is affected such as risks of being held responsible if something goes wrong due to a decision made by them (Cranefield *et al.*, 2014), perceptions of hierarchical administrative structure to reach to or communicate with the superiors (Wirtz *et al.*, 2016), or perception of potential adverse outcomes of openness of data (Barry and Bannister, 2014; Grimmelikhuijsen and Feeney, 2017).

The study conducted by Abbas *et al.* (2019) has explored minimal reasons for not-sharing government data with the public without employing any information system theory. Other studies are conducted on finding out the OGD barriers from the user's perspective, including non-governmental organizations and private sector organizations in Pakistan (Saxena and Muhammad, 2018a), on underscoring the OGD impact on transparency and accountability in Pakistan (Saxena and Muhammad, 2018b), and on investigating the open data use and its effects on the social sector in Pakistan (Shabbir *et al.*, 2020). Therefore, there are significantly fewer studies conducted so far about OGD adoption in Pakistan. Particularly,

according to the researcher's best knowledge, no study has been conducted so far about OGD adoption from the perspective of public sector organizations in Pakistan.

### **1.3 Research Problem Background**

According to the Open Government Partnership (OGP) assessment regarding action plans or commitments to open government, 78 countries have joined the partnership (OGP, 2020a). Among the South Asian countries, the Government of Pakistan (GOP) has joined the open government partnership in 2016 and adhered the open data policies to increase the public's creativity and innovation, transparency, openness, participation in governance, to reduce corruption, and achieve social impacts, (OGP, 2020a; Saxena and Muhammad, 2018a). However, no action plan has been submitted by January 2020 (OGP, 2020b). As a result, Pakistan was marked as "inactive" by the OGP in February 2020 upon not submitting its action plans on open government (OGP, 2020b) and its closed notions, including transparency, access to information, participation, open data, and democracy (Criado and Ruvalcaba-Gomez, 2018). This reflects that Pakistan is not only lagging far behind the developed countries but also in the South Asian region regarding OGD development. A possible explanation for such an issue is the lack of government commitment (Saxena and Muhammad, 2018b) or political will in Pakistan in the OGD initiative (Saxena and Muhammad, 2018a). Other explanations are the absence of motivation, support, and serious attitude at the government level in Pakistan (Shabbir *et al.*, 2020).

Furthermore, concerning open data publication and use by the governments in different countries, the Open Data Barometer (ODB) presents that governments in South Asian countries are slow in open data commitments (ODB, 2017). Notably, Pakistan's overall ranking concerning open data continues to downwards with 23 points, the highest downfall among South Asian countries. This concludes that Pakistan is touching the bottom by continuously backsliding in ranking on opening the data. One explanation is that open data is perceived as an additional

responsibility on the government's end (ODB, 2017). Another elucidation is that data are often siloed within just one public sector body (ODB, 2017).

In addition, according to the developed index by the Institute for Research, Advocacy, and Development (IRADA), Pakistan, no public body can achieve even a 50% score in complying with proactive disclosure of information (Hashmi *et al.*, 2019) as the best performing ministry is Finance achieving 19 points only. In contrast, the Ministry of Overseas Pakistanis is the worst performing ministry with 6 points out of 39 points. Thus, the IRADA, in its survey, finds that a significant majority of public bodies in Pakistan still lag significantly behind in either ensuring their online presence or, if their websites exist, providing only a limited amount of government information proactively (Hashmi *et al.*, 2019). Further, analyzing the dimensions of OGD portals in Asian countries (Aarshi *et al.*, 2018), various challenges are explored and generalized to Asian countries by selecting only seven countries (including Israel, Japan, Taiwan, Bangladesh, Hong Kong, Thailand, and Singapore) out of 27. Pakistan is excluded from the analysis owing to some information on e-government portals but not being open to the public (Aarshi *et al.*, 2018). Among others, some of the significant challenges behind nondisclosure of government data are non-attaining of data automatically through the IT systems, cost of releasing data, inappropriate OGD infrastructure, and data privacy issues (Aarshi *et al.*, 2018).

Fortunately, the GOP realizes that the adoption of open government and open data (such as data related to public service delivery and socio-economic development) are vital requirements in transforming governments to ensure transparency and accountability through citizens' feedback (PC, 2019). In this connection, the GOP is struggling to change its services from traditional to online. Yet, a large portion, which is 63.16%, of e-government portals provides static information (Butt *et al.*, 2019) through which less value can be generated. Thus, in this connection, it can be argued that the adoption of open data in the public sector, which is making government-related data available to the public, is lacking in Pakistan (Hashmi *et al.*, 2019). The open government in Pakistan demands the Right to Information Act, ICT infrastructure, and strong cyber-security measures (PC,



2019). Further in this connection, a geospatial data infrastructure in the public sector of Pakistan requires all public sector stakeholders' eagerness, collaboration with national and international organizations, data sharing policy, leadership, consolidated paper-based records, and human resource capacity (Ali and Imran, 2021).

Governments worldwide are engaged in delivering and distributing data openly to create the expected benefits and value of open data (Kassen, 2018b). Public sector information available in open formats facilitates performing robust statistical analysis, and more value can be generated from them (Abbas *et al.*, 2019). Furthermore, accurate and timely data is regarded to have vital importance for evidence-based policy and government decision-making (Luthfi and Janssen, 2019). However, a substantial amount of valuable data is unpublished in Pakistan's public sector and unable to perform its role in evidence-based planning and development (Abbas *et al.*, 2019). There are numerous issues that a substantial amount of data is unreported to the public and the organizations as they vary from organization to organization and department to department (Abbas *et al.*, 2019). However, overall, public sector organizations in Pakistan are very less reporting or sharing the data due to confidentiality, recognition of the importance and potential benefits, data digitization, decentralized database management systems, demand for data from different stakeholders, summarization of collected or recorded data, and organization's data specificity issues (Abbas *et al.*, 2019).

There are several instances that exist where OGD adoption models are developed and tested by employing or not-employing information system theories in different countries from the data providers-perspective, that are public sector organizations or managers. Wang and Lo (2016) have investigated the adoption of OGD in government agencies in Taiwan using the TOE (technology, organization, environment) theory. Yang and Wu (2016a) have examined socio-technical factors that influence OGD adoption in Taiwan using multiple information system theories. The drivers to participate in OGD initiatives have been investigated among public sector organizations in Singapore using resource dependence theory (Zhenbin *et al.*, 2019). The individual-internal, external, and individual-organizational barriers affecting the OGD resistance among public officials in Germany using cognitive

theory have been studied by Wirtz *et al.* (2016). The role of gross domestic product, innovation, and ICT development on open government has been observed using secondary data of 125 countries (Alderete, 2018). A survey among chief information officers has been conducted in the United States to examine adopting Open e-Government (Ganapati and Reddick, 2012). Therefore, there is a growing interest worldwide in adopting OGD because of its social, economic, political, technical, and operational benefits (Cranefield *et al.*, 2014; Janssen *et al.*, 2012; Ma and Lam, 2019). However, no study has been found so far with respect to investigating OGD adoption using information system theory among public sector organizations in Pakistan.

#### **1.4 Problem Statement**

Governments around the world are increasingly implementing open government data (OGD) initiatives that aim to share data from public agencies through web portals or platforms. Although public sector entities are often considered as the largest creators and collectors of data in various fields, a large quantity of data that should have been shared with the general public is kept hidden by the governments in Pakistan for no good reason (Ahmed, 2021). Unfortunately, to date, the 2017 census has not been approved for release, which should be opened to the public (Syed and Rehman, 2020). Besides, a majority of public bodies in Pakistan provide only a limited amount of government information proactively (Hashmi *et al.*, 2019). Specifically, a substantial amount of valuable data is unreported in Pakistan's public sector organizations and is unable to perform its role in evidence-based planning and development (Abbas *et al.*, 2019). Thus, the under-focused problem in this study is that there is very limited open government data among public sector organizations in Pakistan. Furthermore, there are several instances found where OGD adoption models were presented from the perspective of public sector organizations in different countries using different theories to determine why organizations adopt OGD. For instance, a model to participate in OGD initiatives by Singapore's public agencies using the RBT theory was presented by Zhenbin *et al.* (2019). Wang and Lo (2016) investigated the adoption of OGD in Taiwanese government agencies using

the TOE framework. By employing the TOE framework, a conceptual OGD adoption model in the context of Malaysian local government was developed by Haini *et al.* (2019). Nevertheless, less attention has been given in the earlier literature so far with regard to investigating OGD adoption using information system theory among public sector organizations in Pakistan. In this connection, developing and testing the OGD adoption model for public sector organizations in Pakistan is expected to lead to a better understanding of how to adopt OGD among public sector organizations in Pakistan on a large scale. Thus, the main objective of this study is to develop and test the OGD adoption model for public sector organizations in Pakistan.

## **1.5 Thesis Research Questions**

Based on the problem of this study outlined in Section 1.4, the primary research question is that “How to adopt open government data among public sector organizations in Pakistan on a large scale?” The main research question is further divided into three interrelated sub-questions to address it. These sub-questions are as follows:

- i) What are the potential factors that influence the adoption of OGD in the public sector?
- ii) How to develop and validate an OGD adoption model for public sector organizations in Pakistan?
- iii) What are the implications of the important factors from the OGD adoption model?

## **1.6 Thesis Research Objectives**

Given the research questions mentioned in Section 1.5, the following research objectives are set.

- i) To identify the potential factors that influence the adoption of OGD in the public sector.
- ii) To develop and validate an OGD adoption model for public sector organizations in Pakistan.
- iii) To investigate the implications of the important factors from the OGD adoption model.

### **1.7 Scope of the Study**

This study's boundary spans public sector organizations in Pakistan. They are the largest creators and the primary adopters of OGD for sustainable developments such as transparency, accountability, participation and collaboration, public service delivery, and data-driven decision-making. This study mainly focuses on OGD from the innovation perspective. It is considered from the data providers-perspective instead of data users or consumers since the usage of data depends on its availability. In this study, the unit of analysis is the public sector organizations in Pakistan which include not only the divisions and departments at the federal government level but also the organizations at provincial, state, and municipal levels. Since organizations are the entities represented by the decision-makers, it implies all managers (such as chief information officer, chief executive officer, the data controller, IT director, or public information officer) involved in the decision-making process in public sector organizations to collect the data on the factors that influence OGD adoption in organizations. Further, from an administrative region's perspective, this study caters to Pakistan as the administrative region.

### **1.8 Significance of the Study**

It is not easy for governments to open the data in digital formats due to its closed nature in developing countries. In this connection, studying the factors influencing open data availability by the government is practically essential and

becomes the basis of this study. It is projected that the ranking of Pakistan in the Open Data Barometer will be continued to get a failing grade. Pakistan will be out of the global picture if the reasons behind the very limited adoption of OGD are not explored and necessary actions are not taken accordingly by the government, organizations, and policy practitioners. Without an understanding of the influential factors of OGD adoption in public sector organizations of Pakistan and respective guidelines to make the OGD adoption on a large scale, OGD will continue to remain an aspiration rather than a reality. It is also vital to present an adoption model and investigate the influencing factors that affect the OGD adoption among public sector organizations in Pakistan since no attempt has been made on this important innovation. Better identifying and understanding influencing factors of adoption of OGD in Pakistan's public sector organizations will contribute to a better formulation of strategies to make data resources available openly and thus better use resulting invaluable social, economic, political, technological, and organizational benefits.

Theoretically, the role of data resources, the organization's need for transparency, and adoption intention in evaluating the OGD adoption of public sector organizations have less been explored in previous studies. Subsequently, the role of perceived benefits is inconsistent. Moreover, new conceptualizations (dataset quality, data-driven culture, digitization capacity, compliance pressure, and civil society participation) will cover the theoretical gaps in developing the research model. Therefore, this study is essential to be conducted in Pakistan because there is a need for testing of less explored variables, reconciliation of inconsistent findings, and introduction of new relationships in the perspective of investigating influencing factors on OGD adoption in Pakistan's public sector. The presented research model will fill the theoretical gap in developing and testing new theoretical models, particularly from a developing country's perspective, that is, Pakistan.

## **1.9 Organization of the Thesis**

Chapter 2 produces about what is already known about the subject area understudied. It offers a review of background studies on OGD and adoption as well

as identification of factors and development of a model. Chapter 3 presents the adopted methodology according to which the research study is conducted. It consists of several phases to solve a research problem. Chapter 4 elaborates the development of hypotheses. Chapter 5 demonstrates the data analysis phase of the pilot and main research study and describes the obtained results. Chapter 6 elaborates the effects of findings, in the discussion form, found after a statistical analysis because it is a quantitative study. Chapter 7, the last chapter of this research study, expounds on how the research objectives are accomplished, the theoretical and practical implications, limitations, and further research directions.

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