# An Intention-Adoption Behavioral Model for Open Government Data in Pakistan's Public Sector Organizations–An Exploratory Study

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**Abstract.** Open Government Data (an innovation in the electronic government enabling public sector information accessible by the public in open formats and the ways to enable such facility) has huge potential to increase transparency, accountability, participation, efficiency in operations, data-driven/evidence-based policymaking, and trust on government institutions. Despite its potential benefits, although a few organizations are proactive and have embraced the OGD movement seriously, still OGD has not been widely adopted in Pakistan which might involve several obstacles that worked against such efforts. Driven by the nature of the research, this study conducted an exploratory field study in Pakistan by interviewing five industry experts in the e-government domain as well as attending a conference, and newspapers. This study identifies eight important antecedents to the adoption of OGD in public sector organizations and proposes future research to test their relationships. As the main theoretical contribution, this study extends organizational behavior toward technology diffusion. The findings of this study incite government, policymakers and managers to consider the factors and prepare future strategies on OGD developments.

**Keywords:** Open (Government) Data, Adoption, Organization, Antecedents, Pakistan, Exploratory, Qualitative

# 1 Introduction

"Making public sector information freely available in open formats and ways that enable public access and facilitate exploitation has been termed open government data (OGD)" [1]. Open government data is a subset of open data and is simply government-related data that is made open to the public [2]. The data are public property and governments are the largest producers and collectors of data [3, 4]. These datasets are created, managed, and supplied by different government agencies. Thus, the open data process starts at the organization level. Like other developed and developing countries, there is no centralized data portal launched by the Government of Pakistan (GoP) so far, and despite this, quite a few datasets are being published by the public sector organizations on their own or other data portal like "Open Data Pakistan" launched by collaborative efforts of National Center for Big Data and Cloud Computing (NCBC), Lahore University of Management Sciences (LUMS) and Higher Education Commission (HEC). Also, very less public-sector information are being proactively released by the ministries in Pakistan [5], even the GoP has joined the Open Government Partnership in 2016 [6].

In particular, OGD research has focused more on the West, owing to the growing numbers of OGD policies in the Europe and US [7]. In developed countries, however, research on OGD is at the early stages[8].In the Pakistan context, quite a few studies are conducted i.e. OGD barriers with respect to private organizations [9], diffusion of open data in big quantities across Pakistan [10, 11], OGD adoption from academicians and citizens perspectives [12, 13], OGD impact on transparency and accountability [14], and uses and impact of open data for social sector [15]. However, the public organization's perspective is not yet explored. Therefore, this current study aims to explore the antecedents of OGD adoption in the context of public sector organizations in Pakistan. More specifically, the research question for this study is:

RQ1. What are the factors that drive or deter public sector organizations in Pakistan to adopt OGD?

To achieve this, the remaining part of this submission is structured as follows: the next section briefly describes background literature on OGD adoption, followed by research methods that are presented in Section 3. Section 4 outlines the explored factors, discussion in Section 5, and the conclusion is outlined in Section 6.

# 2 Background

The background only includes conceptual and empirically studies on organizational OGD adoption to publicize the data. Zhenbin, Kankanhalli [4] conducted a study to empirically investigating the open data sharing in Singapore by employing a resource-dependency theory and found that all the factors (including external innovator dependence, conformity need, and sensitivity of function) are supported to have their influence on sharing behavior except data quality, size of the agency, and need for transparency factors. In a study conducted by Wang and Lo [1], the adoption model of OGD in government agencies in Taiwan was developed by using TOE (Technology,

Organization, Environment) theory. They found that perceived benefit, organizational readiness, and external pressure were the influencing factors on OGD adoption whereas perceived barriers factor was not supported as the influencer [1]. By employing the cognitive theory, Wirtz, Piehler [16] proposed and empirically tested the behavioral model that restricts public personnel to implement OGD. All the barriers except perceived organizational transparency had a negative influence on the OGD resistance of agencies' public officials. Grimmelikhuijsen and Feeney [17] developed and tested an integrative framework for the adoption of OGD in US local governments. Routineness and politicized environment bared the negative influential factors on open government adoption. Based on empirical investigation taking secondary data, Alderete [18] found digital adoption, and e-participation, and ICT-development indexes, and the gross domestic product had an impact on open government whereas innovation had no impact on open government. A resource-based theory was employed by Zhao and Fan [19] and empirically investigated the antecedents on OGD capacity. Moreover, an institutional theory was employed by Fan and Zhao [20] and empirically investigated the antecedents on OGD quality. By employing several theoretical models including TOE and institutional theory, the open data publication behavior among government agencies in Taiwan was examined by Yang and Wu [21]. Moreover, in a recently published study by Khurshid, Zakaria [22], a systematic literature review of theories and potential determinants that influence the OGD adoption in public sector organizations was conducted.

## 3      Research Method

This study explored the antecedents by employing a field-based qualitative research approach. In this way, the exploration of factors is expected to be more valuable than using only one method. Qualitative data was obtained from practitioners through interviews, attending a conference on Sustainable Development in a Digital Society (SDDS), and newspapers. Five interviews were conducted with five practitioners in public sector organizations. The interviewees were bearing different positions in public sector organizations as e-government practitioners, director/director operations, and public information officers. The semi-structured interviews were conducted between November 2019 and March 2020. The duration of each interview has lasted around 20-40 minutes. All interview sessions were recorded, transcribed, and presented before the interviewees for validation of the content.

 Both the content and thematic analysis techniques were practiced for commonly recurring themes. However, only the deductive approach (by comparing and contrasting the same of similar conceptualizations in different regional settings) was used during the analysis phase. For instance, all the themes were more or less pre-defined constructs in earlier studies, like compliance pressure, but their nature and influence are found different in the current context and concerning OGD. In sum, selected factors were confirmed from earlier studies.

 The theoretical foundation of the proposed model is based on Technology, Organization, and Environment framework (TOE) [23]. Data quality and technical interoper-

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ability fall in the technology dimension. The organization dimension covers bureaucratic culture, digitation capacity, and knowledge and understanding. The two factors political leadership and compliance pressure are observed in the environment dimension.

## 4 Findings

The findings of the field study and the associated links with theory are presented in the following section.

### 4.1 Data/Metadata Quality

The data quality bears several issues like inaccuracy, timeliness, and completeness [8], ambiguities, formats, and representation [24]. However, the quality of datasets can also be led by the poor quality of OGD infrastructure [8]. Data quality attributes have also been referred to as information/metadata quality [7, 25-27]. It is the data which is the main source and all about in the OGD initiative. The whole concept of openness rotates around data holding by public bodies. Therefore, the quality of data and information is the main concern of decision-makers to adopt OGD because the definition of open data itself is inherently influenced by the quality criteria of data [28]. This factor is not only the main concern in adoption [7] but also in the post-adoption phase of openness of government data [28]. Data is also different from the government departments as another respondent highlights that

*"...the quality of data is also not very consistent. For instance, we are trying to find out about some projects, say, how many numbers of vehicles in Pakistan (3-wheelers, 4-wheelers, etc. simple question. There are two or three organizations that are keeping that data. When we collect data from them, the data was different by a wide margin. One is saying Pakistan has 1-million vehicles- cars. Another will be saying 3-million cars. The third dept. may have different data. Thus, it is quite difficult for us to ascertain how many cars are there in Pakistan",* (Interviewee 3)

The earlier studies outlined the poor quality of data to be the key concern in OGD adoption [29] and overall OGD initiative [7]. We propose that high quality of data will lead to increase adoption intention to open of data by the public sector organizations and thus deduce the following proposition:

**Proposition 1:** Data/Metadata Quality will have a positive influence on the public sector organization's intention to adopt OGD.

### 4.2 Technical Interoperability

Data is generated in the different public sectors at different locations such as ministries, provincial, regional, and local level departments. To exploit data by the users, these public sector organizations need to make the systems [30] and data and metadata [31] interoperable. Interoperability is considered both the technical organizational issue [32]. However, data interoperability is also often considered a bureaucratic and political issue [3, 33]. Interoperability is considered as the technical characteristic based on the argument of Hossain and Chan [34] and Sayogo and Yuli [35] such that interoperability is a technical characteristic in information systems. One of the inter-

viewees also underlined that interoperability is the key barrier in OGD adoption outlining that

"...*The things are scattered. The offices are working in silos. One agency has the data, let say, agricultural land from the Agriculture Department. The same data and information about that particular land are also with Board of Revenue. There is no mechanism that they both should use this data, exchange this data. In IT language, we say interoperability issues. There are certain interoperability issues. Sometimes, their systems are not communicating well. So, this data remains in silos. They do not share with agencies even don't share among themselves.*" (Interviewee 1)

To make the OGD adoption successful, a combined effort by all the public organizations to make the systems and data interoperable is necessary. Thus, the higher the interoperability, the higher the OGD intention. Accordingly, we propose that data interoperability is positively related to intend to adopt OGD.

**Proposition 2:** Technical interoperability will have a positive influence on the public sector organization's intention to adopt OGD.

### 4.3 Political Leadership Commitment

Worldwide, political leaders take several initiatives: making public agencies to adopt proper measures to open the data, championing open data policy, and preparing strategy and directive for departments to act on them, carrying most of the costs for publishing data online (e.g. government of many counties including the US, Denmark, UK, Spain, and Australian carries most of the costs (such as developing and maintaining infrastructure) for publishing data online) [34, 36, 37], and preparing an open business environment where private firms and entrepreneurs can participate [34, 36, 37]. Opening data is the result of a political commitment [25]. Furthermore, the OGD initiative is supported and backed by political commitment and leadership, and this was a strong driver for OGD adoption [38]. If governments cannot see a positive impact of open data, high-level political commitment may reduce, stall, or even go backward the open data developments [39]. Leadership centrality provides shared direction and political visibility [40, 41]. Hence, it is the political leaders who institutionalized the concept of open data - their 'political movement' intended to ensure transparency and participation of citizens in governance [34]. It has been observed that political will or commitment has been an important construct as one of the respondent states that

"...*degree of political will for citizens centric governance through principles of open government is a universal principle. Without political will, we are unable to make decisions. How much technology we have...*". (SDDS Conference)

A lack of leadership to help drive the open data movement would be difficult because it is a critical factor [42]. Therefore, the proposition is that political leadership will have a positive influence on adoption intention of OGD in the public sector.

**Proposition 3:** Political leadership commitment will have a positive influence on the public sector organization's intention to adopt OGD.

### 4.4 Knowledge and Understanding

The government data can be used by different users including not only the politicians, public, media, private organizations but also by other government agencies. The OGD

use needs statistical as well as analytical knowledge and understanding otherwise the data could be misinterpreted. Users should know to make sense or to convert into meaningful information [7]. Also, to make the sense out of the data, users are required to have the necessary resources and capabilities. On the contrary, organizations represented by the policy or decision-makers must also have an understanding of the integrity, usefulness, quantity, and diversity of government data at different locations. More specifically, in Pakistan, government organizations do not have a good idea about how much and to what extent data and information they are generating and collecting. As one interviewee indicated that

*"...Computers are being used, computer operators and IT people are always in the offices. But where we [organizations] are lacking is that they [organizations] don't have a good idea that how much information they are generating and collecting. The things are scattered. In fact, the offices are working in silos".* (Interviewee 1)

Accordingly, it is proposed that the more knowledge and understanding of the government data, the more will be publicized. Therefore, the following proposition has been deduced:

**Proposition 4:** Organization's knowledge and understanding of data will have a positive influence on their intention to adopt OGD.

### 4.5 Digitization Capacity

OGD is not a simple or straightforward process of publishing or releasing government data, rather its publishing goes through the laborious lifecycle [43]. Thus, making the existing data digitized so that it becomes usable involves huge efforts, requires certain conditions and resources which should be invested for such efforts. Organizations must have the capacity to make government data digitized. An organization's expert human resource is the basic technical capacity that can form the organization's digitization capacity to publish the data. Government organizations in Pakistan are lacking the digitization capacity, as one informant indicated that:

*"...Agencies do not have the capacity to map the whole data, number one. They have limited capacity of digitizing this data. It is scattered in files and sometimes, you would find so many bags in sacks, the files are dumped in stores. So, Digitization is the second thing. The hurdle is when we ask them that you should digitize this...we need computers, we need huge infrastructure to digitize this...".* (Interviewee 1)

*"They [organizations] have not good proper technical resources who will design it and implement it. I am not saying there is no shortage of resources in organizations. I am saying that there is no shortage of resources in the market.".* (Interviewee 2)

Fast generation, huge volumes, varied data, and different sources [42] make the data understanding (*"...They do share the data, but it is very difficult to get the data. It is very difficult to implement that. It is very difficult to reach there".* (Interviewee 2)), linking and management more difficult and, in turn, the OGD implementation [44]. Government institutions need new capacities and knowledge to provide integrated support to implementation and to leave no one behind [45]. Based on the aforementioned facts, it may be proposed that the more digitization capacity, the higher their adoption intention towards OGD. Therefore, the following proposition has been deduced:

**Proposition 5:** Digitization capacity will have a positive influence on the public sector organization's intention to adopt OGD.

## 4.6 Compliance Pressure

The unit of adoption can be influenced by the external arenas like a push from international organizations, regulatory agencies, peer organizations within and outside the same government or industry, higher-level authorities [21], or media and the public [46] to share the data online in open formats. The organizations are intended to achieve and obtain greater compliance with the legitimacy requirement within their institutional sphere [38, 47]. Changes and improvements in organization processes can also take place through bottom-up influence like general public and public practitioners. In this connection, one of the interviewees noted that

*"...overly use of Open Data and request for under RTI Act by certain groups with vested rights. Common citizen who is a patriotic citizen could really want to use Open Government Data for positive purposes, such examples are rare."* (Interviewee 1)

The empirical results also indicated that external pressures can serve as the coercive power and is a major indicator of increasing OGD adoption in the Netherlands [48], among government agencies in Taiwan [1]. Similarly, higher-level government institutions pressurize lower-level organizations to conform to the OGD policies and regulations in Singapore [4]. Therefore, we propose that compliance pressure is a predictor of OGD adoption intention and hence the proposition is deduced as:

**Proposition 6:** Compliance Pressure will have a positive influence on the public sector organization's intention to adopt OGD.

## 4.7 Bureaucratic System or Culture

The design of an organization determines its capacity as low or high. In an organization where there is centralization or culture with strong vibrant bureaucracy, the processes are highly cumbersome [19]. Moreover, the implementation of processes is highly bound with the approval of the head of the organization. In the bureaucratic type of organizational design, officials' enthusiasm and autonomy are severely affected. The bureaucratic system severely weakens the official's interest and willingness. The existence of a bureaucratic system or culture is a critical barrier in implementing the OGD initiative [17]. Since OGD can substantially change traditional organizational systems, governments are always closed and keep secrets of the public, and therefore, it is extremely difficult if the traditional bureaucratic system remains unchanged in China [49]. Such a bureaucratic system is also prevailing in Pakistan as one respondent indicated that

*"...so the problem is still these proposals are pending with ministry ... And Why? This same mindset which we perceive everything that is prevailing in the province, it is also prevailing in the center... It [Pakistan] has a long tradition and has a historic bureaucratic system. A strong vibrant bureaucracy. Very simple norm that to put confidential tag on even day to day intra-official communication... First, we have to work hard on changing mindsets of our civil servants. We have to teach them what Open Government Data is, how Open Government Data can be beneficial for public."* (Interviewee 1)

Based on the previous literature and industry respondent feedback, it is proposed that the more bureaucratic culture or system is prevailing in the public organizations, the less the intention of OGD toward adoption. Hence, the proposition is deduced as:

**Proposition 7:** Bureaucratic culture will have a negative influence on the public sector organization's intention to adopt OGD.

### 4.8 Adoption Intention

Not all organizations are willing to publish their data on the Internet (Nugroho 2013) and even if organizations are willing to publish their data, there are still many barriers that counteract the publication of data [50]. Generally, the willingness of organizations would be more when barriers are less, and benefits are more visible to them. Therefore, perceptions, knowledge, and adherence to open data benefits would increase the organizations' intentions towards releasing open data [1, 51]. As one of the informants indicated that:

*"...there is not so much emphasis or eagerness to share the data".* The informant mentioned that *"...and willingness to share data and willingness to take responsibility for what we have done. Because the more public or open data, will give people more credible resources to hold the people and the power more accountable. And that is something which they do not want".* Moreover, *"We [organizations] are not saying that there is no technological lack of resources in organizations. We [organizations] have suggested that because there is no willingness to share the data… and to implement it [OGD]".* (Interviewee 2)

Behavioral Intention is the level to which a person has developed conscious plans to perform or not perform some specified future behavior [52]. In previous OGD studies, behavioral intention has been found as a significant predictor of open data published by government agencies [21], as well as with similar conceptualizations such as likelihood to publish data [53], and adoption intention [34].

**Proposition 8:** Public sector organizations' adoption intention will have a positive influence on their adoption behavior of OGD.

## 5 Discussion

Several factors effect on OGD adoption. Data quality includes several dimensions/characteristics. However, the quality of metadata or information quality is also one of the dimensions of Data Quality in the OGD perspective [7, 27]. Therefore, this exploratory study confirms that data and its relevant metadata are critical for OGD adoption. The interoperability of datasets is referred to as a technological issue that also requires different slacks such as budget and time [34]. The true and sincere efforts from the government would also be a substantial stimulus towards open data movement which this study also confirms and requires further empirical investigation. To make OGD movement momentous, technical and technological capacities are also required by the public sector administrations and confirmed by the participants during the interview session. A significant barrier which restricts the government organizations to seriously adopt OGD is the existence of so many hierarchal levels, approvals

from the higher authorities, and not giving the employees autonomy in organizational decision-making.

## 6        Conclusion and Future Research Directions

Open Government Data is a source to increase transparency, accountability, participation, and policymaking in government institutions. This study aims to find the factors influence on OGD initiative in Pakistan. This study conducted an exploratory study by interviewing industry experts in the e-government domain, conference, and newspapers and identifies eight important factors of OGD in public sector organizations. The theoretical contribution of the study is to extend organizational behavior toward technology diffusion. The practical contribution of the study is to encourage, government, policymakers and managers to consider the addressed factors and to prepare for future strategies for OGD developments. Although this study provides useful findings it has some limitations also. The first limitation of this study is that the model was proposed by interviewing with only five interviewees. Thus, we realized that a comprehensive view might not be obtained. However, the factors are reasonably backed from the earlier studies to make them sound part of the proposed model. The infrastructure and situations may be different in each government organization and this study generally covers factors of OGD adoption. Nonetheless, it is believed that these findings can be directly applied to the whole government sector, however, the government organizations can address various factors at early stages without trial and error. The future work directions include the empirical validation of the proposed model. Also, the future work is suggested to investigate the post-adoption or implementation of OGD.

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