



Contents lists available at ScienceDirect

## Government Information Quarterly

journal homepage: [www.elsevier.com/locate/govinf](http://www.elsevier.com/locate/govinf)

## Exploring open government data capacity of government agency: Based on the resource-based theory

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## ARTICLE INFO

## Keywords:

Open government  
Resource-based theory  
Open government data  
Capacity

## ABSTRACT

Open government data (OGD) are valued by many countries and governments worldwide because of its important political, economic, and social benefits. Based on the resource-based theory, we construct a research model from the aspects of tangible, intangible, and human resources, as well as organizational culture to explore the factors that influence open government data capacity (OGDC). Results indicate that data variables, basic resources, organizational arrangement and technical capacity are directly related to the OGDC of government agencies; power distance negatively moderates the relationship between organizational structure and OGDC; uncertainty avoidance moderates the relationship among basic resources, organizational arrangement and OGDC. On this basis, we put forward relevant suggestions for the following development of OGD.

### 1. Introduction

Open government data (OGD) is significant to the political, economic, social, and cultural development of a country. OGD can encourage the public to actively participate in government events, thereby improving the transparency of government departments (Bertot & Choi, 2013; Dawes, 2010). In addition, various social factors can be mobilized to reuse and create more economic and social values from government data (Graves, 2011). Previous studies have shown that the value of OGD is mainly reflected in two aspects: (1) economic value, which indicates the market value generated by new electronic services and mobile applications based on OGD; (2) social value, which is based on OGD to develop better policies to improve the overall quality of the life of individuals and society (Alexopoulos, Loukis, & Charalabidis, 2016; Attard, Orlandi, Scerri, et al., 2015; Janssen & Zuiderwijk, 2014). Given the potential values of OGD, many countries attach great importance to OGD and devote massive funds and resources to build OGD platforms to open government data to the public.

OGD is of interest to many scholars, and current studies can be grouped into three categories. The first category is the evaluation of OGD from different standards and perspectives (Ubaldi, 2013; Solar, Daniels, Lopez, & Meijueiro, 2014; Kassen, 2013; Zuiderwijk & Janssen, 2014; Carrasco & Sobrepere, 2015; Susha, Zuiderwijk, & Janssen, 2015; Lee & Kwak, 2012). Solar et al. (2014) proposes a model to diagnose the maturity and capabilities of public agencies in pursuing open data principles and practices in terms of technology, the public, organization, laws and regulations, and external users. Kassen (2013) evaluates

Chicago's open data project from aspects of legal infrastructure, political and economic environment, and the project itself to study public participation particularly that of non-government organizations, in an open data platform launched by a local government. Zuiderwijk and Janssen (2014) present a framework for comparing different open data platforms considering several factors, including environment, context, policy content, performance indicators, and public values. The second category is the implementation of OGD (Conradie & Choenni, 2014; Harrison & Sayogo, 2014; Linders, 2013; Lourenco, 2015; Nam, 2015; Sieber & Johnson, 2015; Wang & Lo, 2016; Yang, Lo, & Shiang, 2015). Lourenco (2015) assesses whether the current structure and organization of some prominent open government portals adequately provide the transparency required for accountability. Sieber and Johnson (2015) put forward four possible open data models for future application based on the changing relationship between the government and public. Wang and Lo (2016) propose a research model that integrates the technology–organization–environment framework and find a significant positive relationship among perceived benefits, organizational readiness, external pressures, and adoption of OGD by government agencies. The third category is the value and value generation of OGD (Alexopoulos et al., 2016; Jetzek, Avital, & Bjorn-Andersen, 2013a, 2013b). These studies have described the value generation mechanism of OGD and verify the relationship between system variables and value generation. Jetzek et al. (2013a, 2013b) propose a strategic framework for systematically analyzing the economic and social effects of OGD. Alexopoulos et al. (2016) present a methodology for determining the value generation mechanism of OGD based on an estimation of a value

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model. The aforementioned studies on OGD have focused on the OGD platform and the entire government system. In China, OGD is launched mainly on municipal government levels; however, municipal governments do not have specific information resources and only exercise the right to audit the data. The specific workload of the OGD is held by data holding agencies. In practice, the capacity and degree of OGD of various agencies may differ because of factors such as organizational structure and resources, among others (Conradie & Choenni, 2014; Yang et al., 2015).

In this study, we define open government data capacity (OGDC) as a government agency's ability to open the data they possess to the public in accordance with specific requirements. However, only a few studies on the OGD of individual agencies have been conducted, and they have failed to explain the difference in the capacity and degree of OGD among different agencies. Currently, no clear picture of the factors that influence the OGDC of various agencies exists. Therefore, this study targeted to explain the difference of capacity and degree of OGD between different agencies. By following resource based theory (RBT) and Hofstede's model of cultural index, we construct the theoretical framework of OGDC from the perspective of organizational resources and conduct empirical research in the context of different agencies in Shanghai City. The results will point out the direction and priorities of the development and improvement of OGDC.

This paper proceeds as follows. Section 2 presents the theoretical foundation and research framework. Hypotheses are developed based on existing research in Section 3, and research methodology is described in Section 4. Section 5 shows the analysis and results. The paper is concluded in Section 6.

## 2. Theoretical foundation and research framework

### 2.1. Resource based theory

Resource based theory (RBT) explains that the diverse resources owned by each organization differentiate its performance levels and provide it with a competitive advantage (Barney, 1991). This theory provides a theoretical understanding on how resources can be employed for enhanced outcomes and has been widely employed in different fields. Furthermore, RBT is one of the most compelling theories in the IS research and other business disciplines to explain the relationship between organizational resources and firm performance (Kozlenkova, Samaha, & Palmatier, 2014), where resources are considered assets that enable the firm to conceive and execute strategies that improve efficiency and effectiveness (Wernerfelt, 1984). This theory considers an organization as a collection of resources and presents a powerful framework for uniting several dissimilar resources, which can be combined to generate competitive advantage (Palmatier, Dant, & Grewal, 2007). Specifically, RBT proposes that a firm is a collection of tangible and intangible resources, but only the ones that are valuable, rare, and inimitable can generate competitive advantage (Barney, 1991; Kozlenkova et al., 2014). RBT has also been applied widely in public administration studies (Bryson, Ackermann, & Eden, 2007; Lee & Whitford, 2013) to explore the relationship between organizational resources, attributes and performance. Although many categories of resources are available, we applied the typology suggested by the Grant classification standard (Grant, 2005; Mata, Fuerst, & Barney, 1995; Melville, Kraemer, & Gurbaxani, 2004). Grant classifies resources into three groups, namely, tangible, human, and intangible resources. Tangible resources include financial resources that determine a firm's resilience and capacity for investment and physical resources that reflect the firm's production potential. Human resources are productive services that organizational members offer to the firm in terms of skills, knowledge, and decision-making ability. Intangible resources include technology related intangibles and reputation. The typology is widely used in IS research (Bharadwaj, 2000; Chae, Koh, & Prybutok, 2014; Santhanam & Hartono, 2003), and we also continue to

use this typology in subsequent studies to divide organizational resources into tangible, human, and intangible resources.

In summary, RBT provides theoretical and practical guidelines for assessing organizational resource and performance. Some researchers suggest that RBT also can provide meaningful implications for the study of public agency performance (Lee & Whitford, 2013). As this study aims to identify organizational resources that can promote OGDC and to guide the improvement of OGDC in different agencies, employing RBT as a theoretical framework of our study is highly appropriate. Based on previous studies on RBT in IS and enterprise management, we divide the resources that influence the OGDC of different departments into tangible, human, and intangible resources; the next section elaborates on this division in detail.

### 2.2. Tangible resources

#### 2.2.1. Data resource

Numerous data sets are collected and generated by government agencies to complete various tasks in daily operations. In addition, these data involve almost all aspects of daily life, and government agencies are the largest data holder (Carrasco & Sobrepere, 2015). However, for these government data, the cost of data collection, storage, and generation is borne by taxpayers. In this sense, the data held by government agencies is public; hence, these data should be open to other users from the legal point of view (Open Knowledge Foundation, 2012). Many studies have pointed out the important social and economic significance of OGD, which not only allows the public to understand and supervise daily government operations, and participate in government activities, but also presents the economic value generated by the value-added products or services developed by data developers (Attard et al., 2015; Bertot & Choi, 2013; Janssen & Zuiderwijk, 2014). Meanwhile, the public has the initiative to require intensified authority to obtain increased government raw data (Janssen, Charalabidis, & Zuiderwijk, 2012) and information from the original internal utility to new and possible external use, such as public governance, accountability, and transparency (Bertot, Jaeger, & Grimes, 2010). The data held by government departments is the premise and core of realizing the potential value of OGD. Government departments should integrate internal data resource, determine the scope and form of OGD before its implementation, and in this paper, we consider the data resources of government departments as a kind of tangible resources.

#### 2.2.2. Organization structure

Organizational leadership structure is a type of organizational resource that can influence the quality of administrative decisions, which ultimately affect organizational performance (Hansen, Perry, & Reese, 2004; Lee & Whitford, 2013). In this study, we are highly concern about centralized organizational structure, that is, the concentration of power and authority in the highest leadership of the department. In the context of centralized organization structure, the supreme leader has the absolute rights in decision making and daily operations, and the process is highly cumbersome, with less autonomous agency members; the implementation of any matter required the approval of department head, which leads to poor member initiative and enthusiasm and severely weakened their interest and willingness (Kim & Lee, 2006). The OGD implementation process involves a number of challenges and obstacles, including policies, funding, technology, privacy, and other issues. To avoid such potential problems, employees should go through layers of approval and ask the supreme leader to make the final decision on various issues such as opening certain data and determining openness degree. That is to say, the more centralized the organization is, the more complex approval process need to be go through and the poorer member initiative, resulting in a poorer OGDC of the government agencies. The organization structure of an agency specifically influences OGD as a form of organizational existence, and we group organization structure into tangible resources.

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