

# Industrial Perspectives on Government Open Data Strategy Effectiveness

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## **ABSTRACT**

Abstract. The main objective of this paper is to impart new insights into the factors influencing the effectiveness of Open government data (OGD) strategy and build a predictive model for promoting the strategy effectiveness. Fifteen factors from four themes that shape the OGD strategy were prudently chosen from the literature and included in a survey distributed to the OGD users in the private sector in the US. The four themes are: data quality, technical standards, capacity building and measurements and maturity modeling. These themes are used to build a mixed model for the prediction of OGD strategy. Overall, the effect of the models from the individual four themes were found to have significant impact on the effectiveness of the OGD strategy. However, there are only five out of the fifteen factors from these four themes are found to be significant and used to develop a predictive five-factor model.

**Keywords:** Open Government Data, Strategy, Technology Standards, Data Quality, Capacity Building, Measurements and Maturity.

## INTRODUCTION

Open government data (OGD) is perpetually available, universally accessible, fully discoverable, and readily usable data by humanity-at-large with no restrictions to generate economic values. By and large, many investigators found that OGD improves transparency, efficiencies, economic growth, and engagement and collaboration (Fitriani et al. 2017). OGD is defined as “all stored data of the public sector which could be made accessible by government in a public interest without any restrictions for usage and distribution” (Geiger and von Lucke 2012). The current major factors that affect the OGD strategies can be summarized into four pillars, namely, data quality (Behkamal et al. 2014) technical standards (Zuiderwijk, Janssen, and Dwivedi 2015), capacity building and measurements and maturity modeling model and measurements (Dawes and Helbig 2010). Presently, there is no de facto standardized strategy framework for government to create open data in response to users’ needs and there is no predictive model that can be used to forecast the OGD effective strategy. This study draws on research conducted by other investigators in determining the effective factors on OGD.

## METHODOLOGY AND HYPOTHESES

A survey was carried out using an online tool, (Qualtrics), emails, phone calls and face to face interviews. The survey is created using Likert scale based on levels from 1 to 5, where 1= strongly disagree, 2 = disagree, 3 = neither disagree nor agree, 4 = agree, and 5 = strongly agree. The survey has been distributed to 112 OGD consuming companies, with 68 responses were returned, representing a 61 percent response rate, while 7 participants data have been thrown away due to incomplete answers. The 61 responses were subjected to analysis using JMP of SAS. The following hypotheses have been tested to determine the significance of each of the themes and their associated factors:

- H1: Selected data quality factors have a direct effect on OGD strategy effectiveness.
- H2: Technical standards of the government on OGD have positive effects on its strategy effectiveness.
- H3: The capacity building has a direct relationship with the open data strategy effectiveness.
- H4: Measurements and maturity modeling factors have significant effects on the strategy effectiveness.

## RESULTS

The results indicate that all the four themes are significantly but variably impacting OGD strategy effectiveness. However, not all fifteen factors incorporated in these themes are significant to the same cause.

### **Theme 1: Data Quality Theme**

The data quality theme model has three factors (data completeness, consistency, and accuracy) fits with high significance  $\alpha = 0.01$ . This result supports the first hypothesis ( $H_1$ ). However, only completeness shows high significance with  $P < 0.003$ .

### **Theme 2: IT Technical Standards**

The technical standards theme consists of four factors that have variant effects on the OGD strategy effectiveness. These factors are easy access, data availability, technology infrastructure and one-stop-shop portal. The model fitting with the four selected factors showed a high significance, ( $\alpha = 0.01$ ). This result supports  $H_2$ . However, out of the four contributing factors only 'easy accesses' was found to be significant ( $P < 0.0016$ ) compared to other three factors.

### **Theme 3: Capacity Building**

The fitting of the model for the effect of the four capacity building factors, namely analytical tools, technical support, invitation to gathering and training provision, on strategy effectiveness is significant at  $\alpha = 0.01$ . This result supports  $H_3$ . Furthermore, out of the four capacity building factors that have impact on OGD strategy effectiveness, two have highly significant effects, *viz.* the invitation to gatherings ( $P < 0.0032$ ) and training ( $P < 0.00054$ ).

### **Theme 4: Measurements and Maturity Modeling**

The fitting of the model for the selected measurements and maturity factors against OGD strategy effectiveness is significant ( $\alpha = 0.05$ ). These results are in line with the hypothesis  $H_4$ . Notwithstanding, out of this theme five factors, namely, completeness, easy to access, invitation to gatherings, training provision, clear measurements only the clear measures is significant  $P < 0.0212$ .

### **Mixed Model**

The mixed model combines the pooled effects of the most significant factors of the four themes constructs on the OGD strategy effectiveness. These factors are completeness, easy access, invitations to gatherings, training provision and clear measurements. The fitting of the overall mixed model is highly significant ( $\alpha = 0.01$ ). The resultant cumulative relationship all factors is visualized in Fig.1.

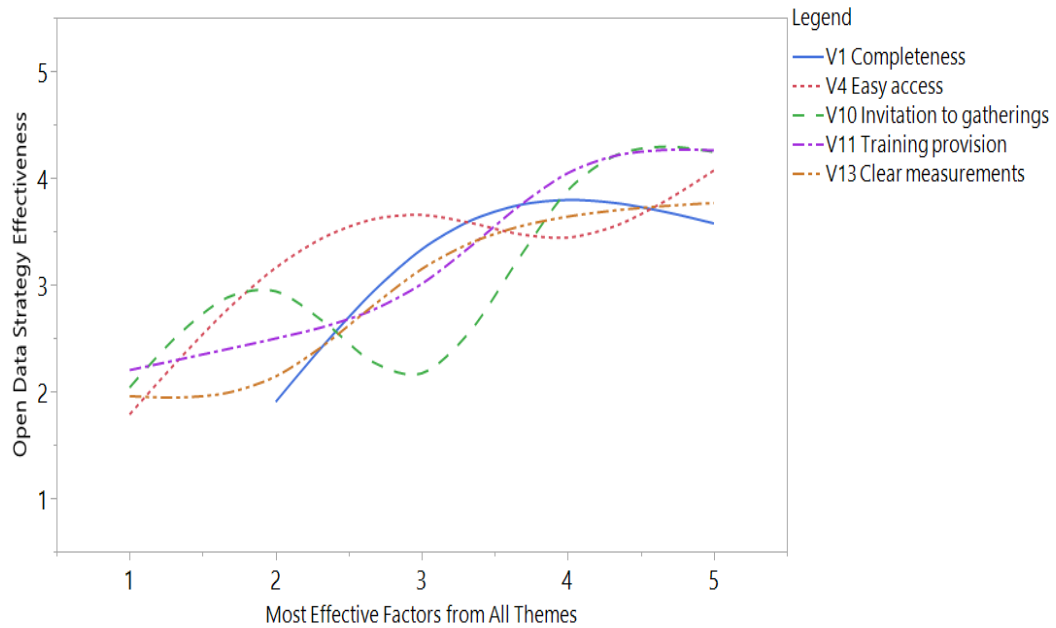


Figure 1. The pooled effect of the most effective factors from all themes on the effectiveness of the open data strategy.

Including themes, the relationship between the variables and the strategy effectiveness is depicted in Fig. 2.

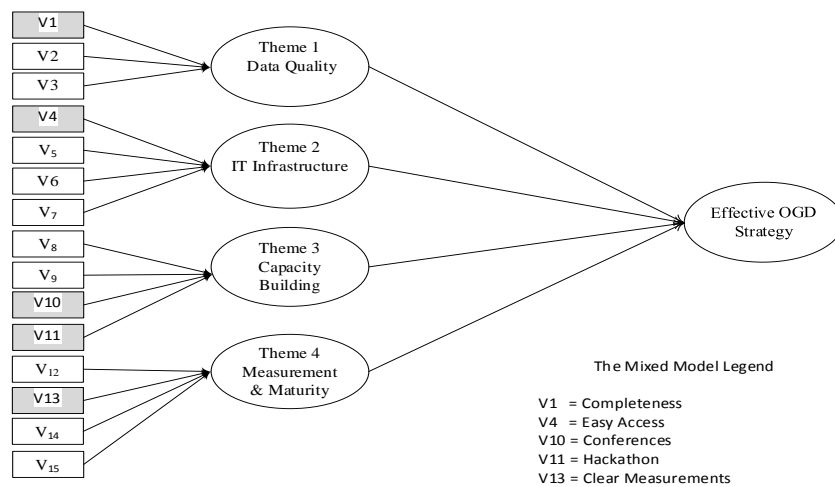


Figure 2. The contributions of the most effective factors to the effectiveness of OGD strategy

through their themes. The most effective factors of the mixed model are highlighted.

## DISCUSSION

The above analysis supports the hypotheses about the themes extracted from the literature. Furthermore, from these results it is reasonable to infer that the selected themes are effective in OGD strategy building in different degrees. However, within the fifteen factors of these themes only five factors are significantly impacting the OGD strategy effectiveness. The findings support the hypothesis that the factors pertaining to the data quality have significant impact on the effectiveness of OGD strategy. In the first relationship, the completeness covers many different aspects of OGD value to the industry. On the other hand, it may be difficult for the government to satisfy the completeness criteria for all data consumers. The other two factors of consistency and accuracy may be considered as complementary to the meaningfulness of the data to the industry.

Easy access factor is the most significant factor that affect the OGD strategy effectiveness, this factor needs to be strengthened by the other three factors of data availability, technology infrastructure and one stop shop portal. These results are in line with (Roman et al. 2018). But data availability depends on the portal availability. Furthermore, one-stop-shop portal should not be a single point of failure for the government, it needs to be supported by an alternative portal in case of disasters.

The significance of the capacity building theme focusses on building knowledge and communication among companies regarding the OGD environment. The results indicate that the two most effective factors of training and gatherings, are socially constructed activities to build knowledge and skill. It is possible that the OGD users may not have the proper analytical or visualization tools to make use of the OGD. However, even if the user possessed the right tools, they may not have the proper technical support that back up the OGD usage. The provision of information about the analytical tools, including visualization, and the technical support by the government will help the industry to make full use of the open data.

In line with the fourth hypothesis, the results indicate that the measurements and maturity modeling theme found to have significant association with the effectiveness of the OGD strategies. This is also indicative to the continual improvement on OGD program that may result in new methodologies for measurement and more effective indicators that lead to better OGD policy and standards. Clear measurement is critical for proper analysis and interpretation. However, the establishment of measurements are exceedingly difficult, especially if they are reflecting the usability of the OGD by users. The best practices and lessons learned are accumulated experiences that can contribute to the continual improvement of the OGD program. Similar observations have been reported by (Vetrò et al. 2016).

Within the tested themes there are only five out of fifteen factors that are significantly affecting OGD strategy. This resultant relationship can be represented in the following model:

$$Y = 0.01 - 0.01V_1 + 0.25V_4 + 0.20V_{10} + 0.30V_{11} + 0.23V_{13}$$

Where Y represents the effectiveness of the data strategy,  $V_1$  completeness,  $V_4$  easy to access,  $V_{10}$  invitation to gatherings,  $V_{11}$  training provision and  $V_{13}$  clear measurements.

## CONCLUSIONS

The main aim of this research was to determine the industry perspective on OGD strategy effectiveness. To take the advantages of the OGD strategies, companies should align their open data usage strategies to benefit from OGD. This calls for the development of new business models to determine data dimension with considerable potential reusability in different business spheres. Accordingly, this study provides a practical insight into the interplay between the identified factors effectiveness of the open data strategy in the industry sector. The model in this study will provide a general roadmap for governments to establish specific strategies in their own environment to satisfy the industry needs

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