

# To Adopt or Not Adopt an Open Government Data Portal. Structural Motivations in Local Governments

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*Abstract: Existing literature in Open Government suggests some structural variables potentially affecting the decision of adopting (or not) an open data portal by public agencies. In this paper, we analyze structural factors to understand the adoption of Open Government Data (OGD) portals at the local layer in one single country. Regarding socio-demographic, economic, political and contextual variables, we carried out a statistical analysis (nonparametric difference Mann-Whitney U test) and we explore the differences between a sample of city councils (adopters and non-adopters). Our results indicate some remarkable findings, including the idea that OGD portals represent the intention of governments and public administration of adopting sophisticated devices to improve their transparency and access to public information by digital means.*

*Keywords: Open government, adoption, public administration, local government, Spain*

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## 1. Introduction

The rationale of Open Government Data (OGD) portals adoption in public settings is an important issue. After more than a decade of implementation of different Open Government (OG) policies, tools, and the inception of the first OGD portals, some scholars have stated the need to explore the motivation of (non) adoption, among other aspects regarding open data in government settings. Particularly, this paper is intended to analyze the structural features explaining the adoption of OGD portals.

There exist different perspectives in the literature about why governments adopt OGD portals. Here, we follow authors explaining OGD portals adoption through structural variables, including

political, economic, socio-demographic factors. From this perspective, the motivation of adoption is mediated by some variables complementary to the decisions made by those involved in the management of public agencies. Methodologically, this paper analyzes the adoption of OGD in large Spanish municipalities, posing the following research question: What structural factors of Spanish city councils with more than 50,000 inhabitants explain the adoption of local OGD portals?

## 2. Studying the Adoption of Open Government Data Portals

Few studies yet explore the motivation behind OGD adoption, focusing most of them on the institutional approach. A recent research on the determinants of OGD adoption by government agencies (Yang and Wu, 2021) carried out a qualitative study consisted on interviews with a total of 27 participants coming from the Taipei City Government. Their findings demonstrate a total of four perspectives that supports the availability of OGD portals. The first is referred to the technological perspective, in which data format, metadata, Information System Outsourcing and level of informatization are highlighted. Second, the organizational perspective implies taking into account the organizational culture, authority involvement, perceived effort, liability, benefit and loss of making OGD available. Another perspective tackles with the legislation and the policy domains, which materializes the constraints of open data. Finally, these authors explore make the environmental perspective, including media and public, plus the peer effect. Then, these factors can function as determinants for the development of OGD portals, but they can also be applied to their pre-viewed availability.

Other studies following the same perspective are Wang and Lo (2016) and Roa et al. (2020). In the first, the authors propose a model for evaluating the adoption of OGD consisting in four main theoretical factors – perceived benefits, perceived barriers, organizational readiness, and external pressures – that are tested through a large survey comprised on 342 respondents from Taiwanese Government agencies. The results provide evidence about a positive relation between the OGD adoption and three of the four factors, excepting the perceived barriers. Moreover, they found that the perceived benefits have the highest degree of influence on the adoption of OGD. In the second, the study states an initial difference between analyses focused on the pre-adoption (construction), adoption (implementation), and post-adoption (usage) of OGD portals. The study is based on new institutional theory in order to analyze the potential forces inhibiting or leading to this adoption. Based on qualitative methodology consisting in semi-structured interviews to a total of eight Chief Information Officers (CIO) from seven different governmental agencies, the final results show three main drivers identified as the participation in professional networks, the common professionalization careers, and experiences from other agencies. Hence, there is a lack of scholarly research analyzing OGD adoption by structural factors in government.

## 3. Research Design and Methods

### 3.1 Research Design

While most of the previous studies have focused on OGD adoption under institutional theory, we have focused on structural adoption factors. For this purpose, we've studied the Spanish local level

of government, following a double strategy. First, we have carried out a qualitative method based on the observation and selection of the 58 OGD portals located at Spanish municipalities with more than 50.000 inhabitants during the period encompassing the end of January and the beginning of February 2020. Second, we have carried out a statistical analysis between those municipalities that adopted an OGD initiative with those that didn't while focusing on their structural factors.

Regarding to the lack of studies focused on OGD adoption under these conditions, we have selected ten structural factors inspired by previous studies on fiscal transparency: population (inhabitants of the municipality); population density (km<sup>2</sup> divided by inhabitants); age of inhabitants (inhabitants aged between 24 and 35 years; inhabitants aged between 36 and 64 years; and inhabitants aged with more 65 years); level of education (level of inhabitants with secondary education); smart city context (municipalities that are Smart Cities); transparency culture (transparency Index at the Local Governments); unemployment rate (% of unemployed inhabitants); economic level (Gross Domestic Product (GDP) per capita); political ideology (progressive and conservative); and finally, political stability (number of consecutive years in power<sup>5</sup>) – information related to these structural factors has been extracted from the National Institute of Statistics (<https://www.ine.es/>), Transparency International Portal (<https://transparencia.org.es/ita-2017/>), Spanish Interior Ministry (<http://www.interior.gob.es/>) and Finance and Public Administration ([www.minhap.gob.es](http://www.minhap.gob.es)) –. These ten structural factors were used to test the following hypotheses that we proposed based on authors that previously have worked in the same areas:

H1. Larger municipalities have a greater potential to make available a local OGD portal (Thorsby et al., 2017; Alcaide Muñoz et al., 2017). We argue that larger municipalities have greater capabilities to enable the availability of a ODP because of the ownership of more resources than the smaller ones.

H2. Higher population density has a greater potential to make available an OGD portal. (Lowatcharin and Menifield, 2015). We hypothesize that a potential condensation of the demands on OGD could have a positive effect enabling the open data portal of the city council.

H3. Older people are more likely to engage with OGD portal, promoting its local availability (Esteller-Moré and Polo-Otero, 2012). We argue that the availability of an ODP could be explained by an older population that have a greater interest and experience to engage with OGD.

H4. Large municipalities with higher levels of education will promote the OGD portal availability (Wang et al., 2019). We hypothesize that higher levels of education could reduce the information gap about OGD promoting the availability of a local OGD portal.

H5. Large municipalities coexisting with a smart city ecosystem will promote the availability of an OGD portal (Pereira et al., 2017). We argue that a smart city ecosystem will promote the availability of a local OGP portals because of the perceived benefits.

H6. Large municipalities committed with the transparency culture are more likely to engage with OGD, promoting its local availability (Alcaide Muñoz et al., 2017; Tejedó-Romero and De Araujo, 2018).

H7. Large municipalities with a higher unemployment rate are more likely to make a local OGD portal available (Tejedo-Romero and De Araujo, 2018; Caamaño Alegre et al., 2013). According to the theory of legitimacy, the government initiative making available a local OGD portal could be interpreted as an attempt to recover the social trust that has been lost by a context of economic crisis.

H8. Large municipalities with citizens with high income per capita promote the availability of local OGD portals (Rodríguez Bolívar et al., 2013; Alcaide Muñoz et al., 2017; Caamaño-Alegre et al., 2013). We hypothesize that a large municipality with citizens with high income per capita is more likely to support the availability of an OGD portal, not only to fulfill a monitoring performance but also to amplify the collaborative and participative ratio.

H9. Left-wing local government is more likely to promote the availability of an OGD portal (Alcaide Muñoz et al., 2017). Our hypothesis is that a left-wing local government is more likely to promote OGD availability just like some of the previous studies on transparency has evidenced.

H10. A greater political stability in the municipality won't promote the availability of local OGD (García-García and Curto-Rodríguez, 2018). We argue that the availability of OGD initiatives will depend on political stability, specifically, we expect a negative relationship between political stability and the availability of local OGD.

### 3.2 Methods

In this study, we analyzed the factors or determinant that could influence in the implementation and development of OGD portals by Spanish municipalities (see Table 1). Regarding the statistical analysis, we have carried out a nonparametric difference test (Mann-Whitney U test) (Mann and Whitney, 1947), given that our sample does not follow a normal distribution, as we can see with the Kolmogorov-Smirnov's normality test (Stephens, 1992) -see Table 2-. For this, two independent samples (for each of the structural factors considered in this empirical study) were taken from the same population of the 145 Spanish city councils (58 municipalities with OGD portals and 87 municipalities without OGD) that have implemented or not OGD portals initiatives. We used SPSS software in its 26.0 version which calculates the probability that two populations are equal, if this probability is too small, we will reject the hypothesis (H0) that both samples come from a population with the same amplitude, considering that there are differences between the populations and therefore, the structural factor analyzed influences on the adoption of these initiatives.

## 4. Results

This section presents the results of our research. First, we present the descriptive results which can be found in Table 1, allowing us to have an idea of the socio-demographic, cities' profile, economic and political characteristics that the municipalities in our sample present, and not least, if any difference is discernible between the two samples. We observe that municipalities with OGD portals have larger population size and higher population density, although they have higher dispersion (std. dev. 472,962.34 and 4,229.69). Also, we can observe that the population pyramid is very similar between both types of municipalities, although a greater dispersion in the municipalities that have developed

an OGD portal. On the other hand, we can observe that the municipalities with OGD portal have citizens with a higher educational level. Also, the SCs also tend to have developed ODP, although there is a higher dispersion (std. dev. 3.09), because only 12 municipalities are SCs. Therefore, the index of transparency culture shows that the municipalities with OGP have a higher index than municipalities without OGP, and with less dispersion (std. dev. 8.84 vs 10.64). Similarly, the Table 1 shows that the councils with OGD portal have less unemployment rate and a higher economic level, also in both case the dispersion is smaller. Finally, the politic ideology and political stability do not show significative differences in the descriptive results.

Regarding our inferential analysis, U Mann Whitney test shows that the population is a variable that influence on the adoption and development of OGD portal initiatives by the municipalities (Sig<0.05), so we reject H1 -see Table 1-, i.e., the city council with different population have different opportunities to face projects that favor the implementation of new technologies that allow the opening of municipalities and the dissemination of information through ODP. In addition, the population density has influence on the adoption of OGD portal (Sig>0,05) and we reject H2. So, the concentration of the population in a municipality seems to exert pressure on public managers to adopt and develop these innovative initiatives.

Table 1: Descriptive Test and Normality Test

Variables	OGD portal	Mean	Std.Dev.	Min.	Max.	Kolmogorov-Smirnov Normality Test		
						Statistics	Df.	Sig.
Population	YES	261,377.64	472,962.34	51,674	3,266,126	0.134	58	0.011
	NO	110,313.61	74,559.17	50,728	453,258	0.168	87	0.000
Population density	YES	3,499.98	4,229.69	54.80	18,894.93	0.214	58	0.000
	NO	1,837.08	1,850.47	68.40	9,597.40	0.170	87	0.000
Age of inhabitants 24_35	YES	9.89	1.04	8.68	13.49	0.151	58	0.000
	NO	9.37	0.69	0.69	12.12	0.152	87	0.000
Age of inhabitants 36_64	YES	11.13	0.86	9.99	14.17	0.150	58	0.000
	NO	10.66	0.51	0.51	12.20	0.177	87	0.000
Age of inhabitants more 65	YES	10.25	0.96	8.81	13.40	0.130	58	0.001
	NO	9.70	0.60	0.60	11.17	0.100	87	0.002
Level of education	YES	2.29	3.09	0.00	12.30	0.230	58	0.000
	NO	1.42	3.01	0.14	16.70	0.339	87	0.000
Smart City	YES	0.22	0.42	0.00	1.00	0.479	58	0.000
	NO	0.05	0.21	0.00	1.00	0.540	87	0.000
Transparency Culture	YES	93.32	8.84	45.00	100.00	0.225	58	0.000
	NO	88.99	10.64	53.10	100.00	0.335	87	0.000
Unemployment rate	YES	6.69	1.99	3.00	11.00	0.204	58	0.006
	NO	8.04	2.65	3.00	14.00	0.168	87	0.002
Economic Level	YES	23,728.96	5,348.24	16,538	41,018	0.264	58	0.000
	NO	21,988.89	5,446.48	15,273	53,185	0.287	87	0.000
Politic Ideology	YES	0.33	0.47	0.00	1.00	0.428	58	0.000
	NO	0.34	0.48	0.00	1.00	0.420	87	0.000
Political Stability	YES	4.29	4.97	1.00	16.00	0.351	58	0.000
	NO	5.23	5.08	1.00	16.00	0.331	87	0.000

In the case of age of inhabitants, we can observe that the significance is lower 0.05 in all age ranges considered in this empirical study (inhabitants aged between 24 and 35, between 36 and 64 and more

65 years), so we reject H3. Therefore, we can affirm that the age of the inhabitants is determinants factor that influence on the implementation of technological projects that favor the transparency of the city councils. Similarly, the level of education shows a significance lower 0.05 (Sig. 0.041) so we reject H4. Then, this evidence assumes that the educational level of the population influences the initiation of open data portal initiatives by Spanish municipalities.

On the other hand, the fact of a city is considered in an international ranking as a smart city if it influences the adoption of these OGD projects. This variable shows a significance lower than 0.05 (Sig. 0.001), so it rejects H5. On the other words, the technological environment that surrounds this type of city favors the undertaking of technologically advanced initiatives, hence a municipality considered smart city in-fluences on the adoption of OGD portal. Give that, these municipalities usually offer a technological maturity that other municipalities do not provide, in addition to an openness to the outside that favors participation with citizens, which allows more possibilities for these initiatives to prosper within this context. Also, we find that the significance of transparency culture is lower 0.05 (Sig. 0.001) so we reject H6, i.e., the fact that a municipality has a developed culture of transparency not influence on the adoption OGD portal initiatives.

Furthermore, in the case of unemployment rate and municipal wealth, we can observe that there is influence on the implementation OGD portal initiatives (Sig<0,05), so we confirm H7 and H8 -see Table 1-, i.e., the economic context in the municipalities that adopt these initiatives seem to influence their decisions to undertake them. Finally, the political context is not a determining factor in undertaking this type of initiative by municipalities, since neither political ideology nor political stability show signs of significant influence on the data, so we accept H9 and H10. It seems that this type of initiative and the factors that force public managers and politicians to undertake and develop them come more from the external environment and the environmental characteristics where the municipality is located than from an initiative undertaken by the people called to manage the public organization.

Table 2: U Mann Whitney Results

Population		Population density		Population with year 24_35		Population with year 36_64	
U Mann-Whitney	1,631.00	U Mann-Whitney	1,927.00	U Mann-Whitney	1,673.50	U Mann-Whitney	1,627.00
W Wilcoxon	5,459.00	W Wilcoxon	5,755.00	W Wilcoxon	5,501.50	W Wilcoxon	5,455.00
Z	-3.600	Z	-2.405	Z	-3.429	Z	-3.616
Sig. Asymptotic (bilateral)	0.000	Sig. Asymptotic (bilateral)	0.016	Sig. Asymptotic (bilateral)	0.001	Sig. Asymptotic (bilateral)	0.000
Population with year more 65		Higher education		Unemployment rate		Smart City	
U Mann-Whitney	1,613.00	U Mann-Whitney	2,016.00	U Mann-Whitney	1,680.00	U Mann-Whitney	2,073.50
W Wilcoxon	5,441.00	W Wilcoxon	5,844.00	W Wilcoxon	3,391.00	W Wilcoxon	5,901.50
Z	-3.673	Z	-2.047	Z	-3.439	Z	-3.256
Sig. Asymptotic (bilateral)	0.000	Sig. Asymptotic (bilateral)	0.041	Sig. Asymptotic (bilateral)	0.001	Sig. Asymptotic (bilateral)	0.001
Economic Level		Transparency Culture		Politic Ideology		Political Stability	
U Mann-Whitney	1,839.50	U Mann-Whitney	1,726.00	U Mann-Whitney	2,479.50	U Mann-Whitney	2,169.00
W Wilcoxon	5,667.50	W Wilcoxon	5,554.00	W Wilcoxon	4,190.50	W Wilcoxon	3,880.00
Z	-	Z	-3.285	Z	-0.214	Z	-1.521
Sig. Asymptotic (bilateral)	2,759.00 0.006	Sig. Asymptotic (bilateral)	0.001	Sig. Asymptotic (bilateral)	0.830	Sig. Asymptotic (bilateral)	0.128

## 5. Discussion and Conclusion

Open Government Data (OGD) portals represent another step forward in the transformation of web-mediated transparency with new tools in the public sector. In this paper we have analyzed structural factors to understand the adoption of OGD portals at the local layer of government (in Spain). The results of the study about the abovementioned variables indicate some interesting findings. On the one hand, our analysis has rejected H1, H2, H3, H4, H5, and H6, and accepted H7, H8, H9, and H10 (we calculated the probability that two populations were equal, if this probability is too small, we rejected the hypothesis (H0)). Therefore, population, population density, inhabitants age, level of education, city smartness, and commitment with a culture of transparency have a role in explaining the adoption of OGD portals. On their side, the rest of variables that we have analyzed seem to be less important, with a special attention to political factors.

After this analysis, some conclusions are developed regarding the comparison of a (similar) group of city councils, including adopters and non-adopters of OGD portals, regarding structural variables. First, OGD portals represent the intention of public authorities to adopt sophisticated devices to improve their transparency and access to public information by digital means. Second, OGD portals have become a new area of interest for scholars to understand the inclination of public agencies to promote Open Government (OG) policies and strategies (Ruvalcaba-Gomez et al., 2020; Sandoval-Almazan et al., 2020). These last authors suggest the importance of OG for better governance, trust, participation and collaborative governance processes, accountability, fairness, or digital efficiency. OGD portals encompass an opportunity to foster the implementation of OG reforms and values regarding the challenges facing public sector managers. Another finding derives from our sample of cases non-adopting an OGD portal. Despite the absence of determination to create an OGD portal, this factor does not confirm the lack of transparency or participation innovations in these city councils. Future research should focus on the motivations of (non) adoption within cities and how this is not just a result of structural factors, as it seems to be, but also of other internal variables requiring different types of analysis.

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