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Demographical attributes explaining different stages of OG development in Spanish Local Governments

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Abstract. In recent years city governments have rethought and changed their governing routines, procedures and processes, to better understand citizens' needs, implementing Open Government Strategies. Our study analyzes the use of technological channels available to citizens by local governments to improve transparency and citizens' participation and collaboration. Our empirical research selected 145 Spanish local governments with more than 50,000 inhabitants. Findings show that the size of the municipality, the population density, the population age and the level of education of the inhabitants could influence on the citizen participation models implemented in sample cities. On the whole, findings indicate that the level of OG development is still low in Spanish local governments, which means that there is much room for improvement in the future if local governments want to make citizen participation true.

Keywords: Open Government, Transparency, Citizen Participation, Collaboration.

1 Introduction

In the last decade, cities have been facing unprecedented challenges due to an increasing population in the urban areas, which has evidenced the need of implementing technology-driven initiatives as a means for improving information transparency and citizen participation in public decisions. Under this framework, city governments have tried to follow a collaborative path in the way of becoming smart, mainly creating smart cities networks [1]

One main smart policy is about the new governance models that these new city challenges require [2]. In this regard, smart cities have focused their efforts on public governance at different levels under the label of Open Government Partnership (OGP). This has become one of the goals to achieve with the ICTs implementation is to provide citizens a higher level of information transparency [3], and a greater accessibility to public services [4], improving, this way, the citizen interaction, its participation and collaboration in public affairs [5]. In fact, although there is still confusion regarding the Open Government (OG) concept, these three main aspects (information, participation and collaboration) have been widely considered in academic literature as the principles that constitute the OG [6]. In this regard, the OECD (2011) [7], has defined the OG as one culture characterized by transparency of its actions, accessibil-

ity of citizens to its services and information, and government responsiveness to new ideas, demands and needs.

Prior research has mainly focused on some attributes like urban population and citizen educational profiles as main incentives for city governments to implement ICTs [8]. However, according to the recent literature review undertaken by [9], to date contextual factors like demographical factors have not been analyzed in their impact on smart city governance, which is linked to the OG movement regarding a more informative, participative and collaborative city governments. Indeed, these incentives have not been analyzed as drivers for OG mature process in the different cities and the literature about differences on the stages of OG development in municipalities according determinants factors is recognized nowadays as relatively limited.

Therefore, based on the analysis of the different levels of the OG development (specially focused on information and citizen participation channels), this paper deepens the understanding of the main attributes of the demographical profiles of cities that could affect their level of OG maturity process. To achieve this aim, this paper is focused on the Government of Spain, whose Central Government has issued several action plans to align this country with the EU guidelines [10] in order to achieve the objectives established in its Digital Agenda [11], and its focus on the modernization and openness of government systems based on the approach of transparency, participation and collaboration. In this sense, the Government of Spain has formulated numerous action plans and legislation has been enacted in this regard [11]. Accordingly, this study aims to contribute to this research gap by analyzing the use of the technological channels available to citizens by local governments to improve transparency and citizen participation, allowing collaboration between citizens and public administrations. Besides, based on main theories about the stages and models of citizen participation [12], we categorized the main aspects of OG into two stages of OG: transparency and engagement. This analysis has been undertaken under the demographical factors (concretely, population size, population density, population age and educational level of citizens) to know whether these attributes affect the different levels of OG development in a sample of 145 Spanish municipalities, with more than 50,000 inhabitants, under the microscope. This analysis will provide us with an overview of the practices carried out, so as to establish conclusions and public policy recommendations that could favor these initiatives by public managers.

The paper is structured as follows. Section 2 provides details of theoretical framework of the study whereas section 3 details the empirical research undertaken in this paper. Section 4 describes the main results of our research and, finally, section 5 conclusion and discussion will bring the paper to an end.

2 The OG maturity models and the Arnstein's Participation Ladder

The question of maturity models in OG is something confused. Prior research has identified the OG maturity models as e-government maturity models [13]. Nonetheless, the e-government field of knowledge goes beyond the OG concern which is fo-

cused on governance issues. This way, others have clearly identified OG maturity models as steps or stages for achieving a greater level of governance but only in specific areas, like innovation [14], or through the use of specific technological tools, like social media [15].

By contrast, despite the time passed by the Arnstein's ladder of participation (ALP) [12], although changed and evolved, her work can provide nowadays the foundations for the central concepts included in the new governance models to be implemented in smart cities [16]. Indeed, in the last years it is growing in the presence of the ALP in the urban planning literature [16], and it has been recently used as a framework for the assessment of participatory models [17].

According to [12], there are eight rungs on a ladder of citizen participation which can be categorized into three main approaches according to the level of interaction between citizens and governments: a) Nonparticipation; b) Degree of tokenism and c) Degree of citizen power. Whereas the first one is mainly driven to manipulate and learn the "non-educated" citizens, the second approach is mainly addressed to improve information transparency and inviting citizens' opinions but the power of making decisions keep at the government level. Finally, the third approach is that of really a participation one where governments delegate some level of power for citizens to participate in an associated or in an individual basis to the public policies and decisions.

As noted previously, the three aspects that build the OG concept are information, participation and collaboration [18] which deal with the concepts of transparency, citizen engagement and citizen cooperation with public entities [19].

The transparency (TRANS) includes the information and consultation rungs in the ALP (third and fourth rung) and is mainly addressed to achieve government accountability and, by this way, better democracy avoiding government corruption [20]. In this approach, there is a unidirectional (information) or bidirectional flows of information (consultation) that only offer the possibility of obtaining, requesting and sending information to the public managers through customer satisfaction survey [21].

Citizen engagement (CITENG) includes participatory mechanisms that give opportunities for open and transparent discourse among citizens and government officials [22]. In brief, although a participative stage, the citizen influence in public decisions is still indirect, showing a slight authority of those involved [23].

Finally, citizen cooperation (CITCOO) represents the collaborative environment with citizens where citizens' highest level of authority is exercised. Collaboration involves the interaction among citizens, interest groups and government in the search for solutions to solve complex urban problems in a shared power basis. It means the need of public administration for promoting public policies with a view to strengthen the role of citizens in the governance process [24].

In sum, recent prior research indicates that the ALP seems to be a good framework for analyzing new governance models implemented in modern cities [17]. These cities have been implementing in the last decades new technologies for facing the new challenges given rise with the increasing growth of population. As this population growth is recognized as one of the main problems of urban areas, in our research, we seek to

analyze whether different demographical attributes could help to understand the OG development stage of sample Spanish cities.

3 Empirical Research on large Spanish municipalities

3.1 Demographical attributes and research questions

Harrison et al., [25] point out that the OG projects must produce public value. Nonetheless, the eventual success of an open government initiative often depends on the environment and the context [26]. In fact, based on the different theories (agency, legitimacy, contingency, capability and neo-institutional theories), prior research has demonstrated that demographical attributes have influence on both the level of implementation of ICTs in municipalities [27] and the acceptance and use of technological advances by citizens [28].

Thus, based on prior research, it is expected that main demographical attributes like the municipal size, the population density, the age of the inhabitants and the level of education of citizens could affect the OG maturity models implemented in the urban areas.

Municipal Size (POP)

According to the agency theory [29], large-size governments with a high degree of information asymmetry are expected to disclose a higher level of government information [30], improving democracy. In addition, it is recognized that municipality size is a main incentive for municipal innovation [31] and technological advances [32]. Thus, if the transparency improves and technological advances are implemented in local governments, citizens will better understand and trust in public processes and will be more likely to e-participate in public decisions [33]. In these technological contexts, public participation channels favor immediate communication between citizens and governments, reducing agency costs [34]. Also, prior studies have found a significant influence between the municipality size and citizen participation channels (websites or social networks) [32]. Therefore, the following hypothesis is derived:

H1. The population size of municipality positively influences on the level of OG development

Population Density (PDEN)

Based on the theory of legitimacy [35], actions are influenced by the information disseminated among different stakeholders, as a result of their legitimacy [36]. In this context, previous studies have found that the higher and more concentrated population in urban areas, the higher availability and use of new technologies [37]. Thus, when the population density is higher, citizens will have more internet access avoiding face-to-face contacts with their local governments, which will be driven through the use of more diverse public participation tools [38]. Taking into accounting this finding, we propose the following hypothesis:

H2. The population density positively influences on the level of OG development

Population Age (AGE15_24; AGE25_35; AGE36_64)

The theory of contingency advocates that social structure variables about both the information users and the political-administrative system, as well as their implementation barriers affect the citizen participation in public decisions, politics and administration [39]. In addition, it is demonstrated that the design and performance of open data projects are mainly linked to the individual profiles and motivations of citizens [40], and not as a way for giving citizens the opportunity to require protests, complaints, common causes, social demands, etc. [41].

Indeed, the population age is a main characteristic of the information user that influences on both the preferences/behavior of citizens regarding their interest in the dissemination of information and his/her public participation, and on the use of new ICTs as channels to be connected with city governments [42]. In fact, [43] considered that the population age is clearly associated with the use of e-government services, and recent research has found that younger people plays an active role in the society through the use of new ICTs. Also, [44] found older population are those with a higher demand for online information and public participation. Based on these assumptions, we propose the following hypothesis:

H3. Cities with higher proportion of young people positively influence on the level of OG development

Level of Education (SECEDU; UEDU)

Based on the capability theory [28], the main interest to participate in public decisions comes mainly from citizens with higher levels of education [45], because it has been demonstrated that the level of education is statistically a significant predictor with respect to the attitude of citizens to participate in these decisions. Thus, citizens with a high level of education will actively play a decisive role in government decisions through the use of ICTs in their daily lives [30]. However, these findings are not consistent with other studies that did not find a significant relationship regarding this issue [46]. Therefore, the following hypothesis is derived:

H4. The level of education of the population living in a city positively influences on the level of OG development

3.2 Sample selection

Spain has done through both the adherence to OG principles (for example, adherence to the OG Partnership in 2011 and recommendations of the OECD on the Digital Strategies of the Government [47] and the issuance of several domestic regulations and actions plans to transform all levels of public administration in open, receptive and accountable governments. Indeed, the Spanish Central Government has carried out three action plans, focusing on regulations about information transparency and financial sustainability [48], on the creation of transparency websites as permanent channels for information [49] and on favoring the citizen's participation in public issues through a participatory space on the transparency website and the opening of a

dialogue between the political forces and citizenship (third action plan, 2017-2019) [50].

These OG Spanish public policies have taken special incidence in the local government sphere due to the great number of services provided and the impact of their public policies on their citizens' daily file. In addition, local governments are usually among the first to adopt new technologies [32] with the aim of providing efficient services to the public, and they are called to be key actors to create an interactive-, participatory- and information-based urban environment, reforming city governance in a framework to encapsulate collaboration, cooperation, partnership, citizen engagement and participation [2]. Therefore, this research is focused on large Spanish local governments with more than 50,000 inhabitants (145 municipalities) that represent more than 50% of the Spanish population (National Institute of Statistics, 2018).

To analyze the initiatives of the sample local governments in the implementation of OG policies, we visited their official websites, and other channels that allow citizen participation during November-December 2019. Then, we collected information about the different levels of OG development (TRANS; CITENG and CITCOO) according to the channels offered by the sample municipalities (see Table 2).

3.3 Independent attributes and method

To identify the factors that affect the three key aspects of OG (TRANS; CITENG; CITCOO), we have analyzed the official websites and other official channels for participation (like social media, apps and e-participation tools) as well as online information of each of the 145 sample municipalities. The authors of this paper have separately catalogued whether the sample municipality is: a) disclosing information about events and issues of public interest or carrying out surveys to collect the opinion of their citizens (TRANS) -stages 3 and 4 of ALP-; b) allowing citizens to participate in municipal plenary sessions (CITENG) -stage 6 of ALP-; and c) allowing citizens to participate in public discussions (CITCOO) -stage 8 of ALP-. To ensure objectivity, after this cataloging method, authors discussed their results to achieve a consensus of the examinations performed. If there were any significant discrepancies, the websites and other official channels for participation were jointly examined again by all authors.

Also, based on previous sections, we have analyzed four demographical attributes to answer the research questions posed in this research: population size (POP) -RQ1-, population density (PDEN) -RQ2-, population age (AGE) -RQ3- and level of education (SECEDU; UEDU) -RQ4-. In order to undertake our analysis, the population and the population density have been classified into quartiles (see Table 1). As for the population age and the level of education, we have classified sample municipalities into three groups according to the median score in each one of the subgroups included into these attributes (see Table 1). In brief, Table 1 shows the definition and calculation method of each of the dependent and independent attributes.

Table 1. Definition of the attributes and total descriptive data on the rungs and stages achieved by sample municipalities

Attributes	Acronym	Definition	Calculation/Method used/Rung ladder of participation
Information and Consultation	TRANS	Information and Consultation phases	Rung 3. Informing Rung. 4. Consultation
Citizen Engagement	CITENG	Participation phase	Rung. 6. Partnership
Citizen Cooperation	CITCOO	Collaboration phase	Rung 8. Citizen control
Population	POP*	Population residing in the municipality	Percentage of quartiles of population size
Population Density	PDEN*	Population residing in the municipality per km2	Percentage of quartiles of population density
Population Age	AGE_15-24*	Numbers of inhabitants from 15 to 24 years old	<ul style="list-style-type: none"> • Group 1: the cities with median score lower than 9.94% from 15 to 24 years old, lower than 11.96% from 24 to 35 years old and lower than 44.75% over 35 years old • Group 2: the cities with median score higher than 9.94% from 15 to 24 years old, higher than 11.96% from 24 to 35 years old and higher than 44.75% over 35 years old • Group 3: all other cities that: do not comply with the above conditions
	AGE_24-35*	Numbers of inhabitants from 24 to 35 years old	
	AGE_35-64*	Numbers of inhabitants from 35 to 64 years old	
Education Level	SECEDU*	Number of inhabitants with secondary studies	<ul style="list-style-type: none"> • Group 1: cities with median score lower than 10.72% in secondary studies and lower than median score of 24.74% in university studies • Group 2: cities with median score higher than 10.72% in secondary studies and higher than 24.74% in university studies • Group 3: all other cities that: do not comply with the above conditions
	UEDU*	Number of inhabitants with university studies	

Notes: *INE (Statistic Institute of Spain) www.ine.es.

On another hand, it is a surprising result the intention of sample municipalities for allowing citizens to participate in public decisions (73.10% in partnership rung), which could help to understand the effort of municipalities in engaging citizens to participate in municipal plenary sessions either in person or through different online participation channels. However, there is a low relevance of citizen cooperation in sample municipalities. Only the 26.90% of sample municipalities allow citizens to participate in discussions about public affairs of the municipality.

As for the influence of demographical attributes on the level of OG development (RQ1, 2, 3 and 4), results seem to confirm a relationship between large municipalities and higher level of OG development (RQ1). In this regard, data seems to indicate that large-size cities are more prone to promote citizen engagement (stage II) and citizen cooperation (stage III) than small-size cities (see % in q4 for CITENG and CITCOO).

Table 2. Descriptive data about different stages and all demographical attributes

Stage and Question	Q	POP % (H1)	PDEN % (H 2)	Group	AGE % (H 3)	SECEDU/ UEDU % (H4)
Transparency stage (TRANS)						
3. Is information disclosed about events and issues of public interest to be produced by the municipality?	1	23.45%	22.76%	1	17.24%	31.03%
	2	24.14%	24.14%	2	18.62%	34.48%
	3	23.45%	24.83%	3	60.00%	30.34%
	4	24.83%	24.14%			
	TOTAL	95.86%	95.86%		95.86%	95.86%
4. Are surveys carried out to collect the opinion of citizens?	1	10.34%	8.28%	1	4.83%	13.79%
	2	12.41%	11.72%	2	11.72%	17.24%
	3	11.72%	13.10%	3	30.34%	15.86%
	4	12.41%	13.79%			
	TOTAL	46.90%	46.90%		46.90%	46.90%
Citizen Engagement stage (CITENG)						
6. Are citizens allowed to participate in municipal plenary sessions?	1	16.55%	15.17%	1	11.03%	19.31%
	2	18.62%	16.55%	2	15.17%	26.90%
	3	17.24%	20.00%	3	46.90%	26.90%
	4	20.69%	21.38%			
	TOTAL	73.10%	73.10%		73.10%	73.10%
Citizen Cooperation stage (CITCOO)						
8. Are online discussions held?	1	6.90%	4.83%	1	2.07%	3.45%
	2	6.21%	4.83%	2	4.83%	11.03%
	3	5.52%	8.97%	3	20.00%	12.41%
	4	8.28%	8.28%			
	TOTAL	26.90%	26.90%		26.90%	26.90%

Notes: "Q" adopted two values → population classified by quartiles: 1 (0 – 67,640); 2 (67,641 – 88,096); 3 (88,097 – 172,816) and 4 (172,817 - 3,182,981) and population density classified by quartiles: 1 (0 – 506); 2 (507 – 1,478); 3 (1,479 – 3,211) and 4 (3,212 – 18,895)

"Groups" adopted different values →

- 1) We have calculated median and formed three groups: 1 (citizens over the median of inhabitants from 15 to 24 years old + citizens over the median of inhabitants from 25 to 35 years + citizens over the median of inhabitants from 36 to 64 years); 2 (citizens over the median of inhabitants from 15 to 24 years old + citizens under the median of inhabitants from 36 to 64 years); and (citizens under the median of inhabitants from 15 to 24 years + citizens under the median of inhabitants from 25 to 35 years old + citizens under the median of inhabitants from 36 to 64 years).
- 2) We have calculated median and formed three groups: SCs in which educated population is over the median in both secondary education and superior education, SCs in which educated population is under the median in both secondary education and superior education and a third group with the rest of the options.

Concerning the relationship between citizen concentration in urban areas (PDEN - RQ2-) and level of OG development, our empirical data seems to indicate that the higher citizen concentration in urban areas, the higher level of OG development, especially regarding citizen consultation, engagement and cooperation (see % in q3 and q4 in TRANS -rung 4-, CITENG and CITCOO). Nonetheless, both rung 4 and rung 8

have obtained a low level of accomplishment, which indicates a high potential to improve these aspects in the future. In brief, analyzing population variables (POP and PDEN), our data reveals that public managers in larger and more densely populated cities are more motivated to implement OG initiatives.

In the particular case of the AGE attribute (RQ3), results seem not to indicate a preference for a particular young (group 1) or old citizenry (group 2), except for the citizen consultation rung (rung 4), although it seems clear that older people are more prone to participate and collaborate than the younger ones (see % in rungs 6 and 8). Indeed, cities with a medium-aged citizenry achieve a higher level of OG development (see % in group 3 in all rungs).

Finally, results showed that cities where low-educated people live in are those with low scores at consultation, engagement and, significantly, cooperation rungs (see Table 2). Indeed, results show a low percentage of OG development in these rungs in cities where low-educated people live in. However, cities where medium and highly-educated people live in, the level of OG development is much higher. Besides, results seem to indicate that cities where highly-educated people live in are those where the consultation rung is highly achieved by city governments (see % in Table 2). It could mean that city governments are usually more prone to collect the opinions of their citizens, sharing knowledge and capacities for problem-solving issues in the city.

4 Discussion and conclusion

This study contributes to understanding the level of OG maturity development in Spanish large-size cities (those with more than 50,000 inhabitants) and deepens the understanding of the main attributes of the demographical profiles of cities that could affect their level of OG maturity process (and concretely, the analysis of the population size, population density, population age and citizens' level of education). On the whole, findings indicate that the level of OG development is still low in Spanish local governments, which means that there is much room for improvement in the future if local governments want to make citizen participation true.

Findings indicate that the informing rung is fully achieved in all sample cities. Therefore, the information phase is already overcome in cities, disclosing a high level of information about events and public interest affairs through the use of different technological tools like official websites, social media, etc. This finding confirms prior research that indicates that city governments are mainly focused on unidirectional information disclosure [51].

Also, findings show the intention of city governments to make citizens to participate in plenary sessions of the Council Board of the city (rung 6 of ALP). Nonetheless, this finding is mainly present in large-size and highly-densely populated cities, where city governments promote both the citizen involvement in the plenary sessions of the Council Board of the municipality and the online discussions, but the online discussions are nowadays almost inexistent. Indeed, city governments are not worried about collecting opinions of nor having discussions with the citizenry (rungs 4 and 8, consultation and cooperation). Therefore, findings seem to confirm that city govern-

ments are more concerned to both achieve the legitimacy of their actions and reduce agency costs than an effective participation of the citizenry -agency and legitimacy theory- [34].

Also, findings show that there is not preference in city government to achieve a higher level of OG development where young people is living in. This result is not on the way of prior research concerning the younger people to be more prone in using ICTs than older people [52]. Indeed, our finding confirm [43] study where medium-aged population used ICTs at the same grade. In addition, it could indicate that, nowadays, the cultural and generational gap regarding the implementation of ICTs has been solved and all citizens are used to utilize the ICTs for interaction with the government, avoiding the digital divide, which represents an active role of all citizens in the information age since they are immersed in new ICTs.

Finally, findings have confirmed that city governments are more prone to promote citizen consultation, engagement and cooperation where medium and highly-educated people are living in. Especially, the consultation rung seems to be linked to cities where highly-educated people are living in.

As this is a first approach to this research field, this study has some limitations, including the analysis of the information quality disclosed or the will of citizens to participate and/or cooperate with city governments. Therefore, future research should deepen in these issues and widen the sample selection to other countries and different contexts with the aim at analyzing if our findings are context-dependent. Also, other attributes could be analyzed seeking to know the whole factors and barriers in the OG development models. Finally, statistical test could help us to strongly support this first approach to this topic.

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