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Digital by Default: The Use of Service Channels by Citizens¹

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Abstract. The use of information and communication technologies by governments is increasing, in many cases to establish new channels of interaction with citizens; and digital by default has been presented as a guide for the development of electronic services. This article discusses the possibility of creating new exclusion forms and is based on the analysis of the profile of use of service channels SP156 of the São Paulo City. To do so, it uses databases of service requests, made available through the City's Open Data Portal, as well as sociodemographic data from the city's districts. It was verified that there is a statistically significant correlation between the average monthly income level of the districts and the type of channel used by the citizen to make the requests. It is concluded that it is important to provide multiple channels for citizens to interact with governments so as not to lead to further social exclusion.

Keywords: E-Government, Service-channels, Digital-by-default, Brazil.

1 Introduction

The ways in which governments interact with their citizens, as well as how citizens interact with their governments, have changed over time. In part, this change has been leveraged by the governmental use of information and communication technologies (ICT), known as e-government, which aims to improve government performance and processes [3] and, consequently, the government itself [18]. In addition, the use of ICT contributes to transparency, increased accountability, and changes the role of citizens, allowing them to stop being mere consumers of public services [2]. This article focuses on the usage profile of service channels, captured by different service channels of a mega city in the global south, discussing and demonstrating another possible form of exclusion in the case of digital orientation by default. The provision of services solely through electronic channels, as a self-service based on the idea of digital by default,

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creates the pre-requisite that citizens are capable, have digital skills, and have the socioeconomic conditions to benefit from online services [26].

The literature on e-government is vast, especially since the 2000s [4]. However, as already pointed out [27], there is a tendency to depoliticize digitalization, as if it were restricted to technical discussions, minimizing its political content and consequences [27], [8] [12], disregarding the context of social exclusion [26]. As noted by Schou and Pors [27], few research projects have addressed the provision of e-services and digital exclusion, although there are studies on digital divides and social exclusion [27], [15].

In order to understand the SP156 multichannel usage profile of São Paulo City, as a basis for discussion of the digital by default concept, this article provides a quantitative data analysis from the City's Open Data Portal [21]. In December 2016, the City of São Paulo improved the availability of online citizen service channels: the Service Portal SP156 – reformulating the former Citizen Assistance Service (SAC) with regard to the presentation of services and the most simple and user-friendly language – and SP156 App, a new service channel. Using these new platforms, citizens can register their requests to the municipal government through the website or app.

In an effort to understand how citizens from the 96 districts of the City of São Paulo interact with the municipal government to register requests for public services, this paper brings a data analysis of requests registered in citizen service channels, called SP156, which can be on-site, online or via call center, and which are available on the Open Data Portal of São Paulo City [22]. The aim is to answer the question *what is the usage profile of SP156 channels of São Paulo City Hall?*

São Paulo City's population is estimated to be more than 12 million inhabitants [10], ranking it among the world's largest cities, and it has a high Municipal Human Development Index for the Brazilian standard (0.805) [11], but also has high inequality among its population, with a Gini index of 0.6453 [6]. This paper is relevant because the discussion of digital orientation by default using the city of São Paulo data may inspire public managers to reflect on the offer of channels to the citizen and on the need to provide mechanisms other than digital ones, especially in the large cities of the Global South. The data processing of requests showing territory is also a contribution to the administrators of big cities, so that they can design services considering the territorial and social differences, like the income of a specific territory.

2 Service Channels

The ways governments and citizens interact have changed over time, in part influenced by the governmental use of ICT. More and more governments are required to offer electronic services (e-services), delivering services that empower citizens and meet their needs [4], [13]. The use of ICT in the provision of services aims to improve public management, as well as increase the provision, quality and effectiveness of the services provided [1], efforts that only make sense when they create value for citizens [14]. In this paper, we understand e-services as the use of ICT tools as a channel for providing public services to citizens [4].

One of the lenses used by scholars to study e-government is considering levels of interaction between governments and citizens through the use of ICT [3]: the first level would be the provision of public information on websites; the second adds forms of contact and interaction that members and organizations of society can use to obtain detailed information; the third level considers the possibility for citizens and organizations to carry out online transactions; the fourth level is ultimately tied to shared governance, with greater collaboration in the decision-making process, and a flow of information sharing and generation by governments and citizens.

This fourth level of e-government is also described in the literature as Government 2.0, referring to Web 2.0, which brings more interactive technologies, and whose main benefit is to promote transparency and citizen participation [1], [25]. Government 2.0 can be understood as being more interactive, communicative, and that has the potential to change the way governments and citizens interact [14], [25], including the possibility for citizens to play an active role not only in consumption but also in content creation [2] and the co-production of public services [26].

The new forms of interaction, leveraged by ICT, influence the growing use of multi-channel for interaction, especially electronic channels [7]. However, to make these new forms of interaction possible, it is necessary to consider the existing digital gaps which, if not considered, can reinforce current socio-economic and territorial inequalities. Schou and Pors [26] emphasize that citizens have increasingly been understood as being “digital by default” by decision makers, placing those who do not use digital technologies as non-standard. The criticisms [27] regarding the understanding of the digital by default are that, by including self-service solutions, citizens are understood as being responsible for seeking services themselves, impacting people who do not use digital technologies who will thus face new forms of exclusion.

These new forms of exclusion are known as digital divide and can be distinguished by two groupings or levels [5], [24]: the access divide, that include people who don't have access to the technology and those who do, faced mainly in developing countries; and the skills usage divide, that include people who do not have not skills to use technology and those who do, faced mainly in developed countries – where the first gap has already been closed or reduced. The lack of skills impacts the use of online government services [29] and this must be considered when more and more governments are offering online services and presuming that citizens are able to fully use all those online services [28].

When implementing policies that presume digital devices (mobile phones or computers) usage for interaction, it is also necessary to consider that the request may contain biases [17]. Those policies should consider that, in order to interact through digital solutions, citizens should “have access to the device and app, and the context” [18]; if there is no other form of interaction and citizens do not have access to any of these three conditions, they cannot, for example, engage in interactions with governments, generating forms of digital exclusion. O’Leary [18] cites the case of Street Bump, a mobile app implemented in the city of Boston (USA) to capture the holes in the streets of the city; to use it, citizens had to have the app installed, an iPhone and a car, conditions tied to socioeconomic issues that could result in the improvement

of some areas of the city and not others. Therefore, it is important to consider the territory – and all the socioeconomic issues inherent to it.

These issues should be considered even more in a context such as Brazil's, where 67% of the population are Internet users² [16] – 74% in the Southeast region of the country, where the city of São Paulo is located – and 71% of the population in Brazil [17] – 76% of the population in that region – said that they had used the Internet in the last three months. Specifically, 96% of higher social class³ users are Internet users by mobile phone, contrasting with 48% of lower class, numbers that approximate the proportion of individuals who have used e-government in the 12 months prior to the date of the survey: 86% from higher and 44% from lower classes [17].

3 Methodology

In order to answer the research question what is the usage profile of SP156 channels of São Paulo City?, an exploratory-descriptive study was carried out, with a quantitative approach, through secondary data analysis, and whose methodological procedures can be grouped into four distinct stages: data collection, obtained from Service Center SP156 of São Paulo City request records [21]; sociodemographic data, obtained from the Brazilian Institute of Geography and Statistics (IBGE) Demographic Census 2010 (Census 2010) [10]; Service Center SP156 data cross-referencing with the IBGE data; and citizen profile analysis regarding the interaction with SP156.

Data referring to the services recorded by the Service Center SP156 were extracted from Open Data on the São Paulo City website [22] on 10/15/2018⁴ and, for this research, the service request data in the second half of 2017 and the first half of 2018 were considered.

Initially, a total of 720,529 occurrences were obtained. However, due to the focus of this paper being to analyze the usage profile of SP156 service channels, the following records, and respective amounts, were disregarded: records without district, 21,320 occurrences; records without service channel classification, 484 occurrences; service channel type "Integration"⁵, 30,929 occurrences. In this way, the final sample was

² Internet users are considered individuals who have used the network at least once in the three months prior to the survey [11].

³ This social classification is based on Brazilian Economic Classification Criteria (CCEB), as defined by Brazilian Association of Research Companies (ABEP). In order to make the classification, it is considered the possession of some durable items of domestic consumption, plus the instruction degree of the domicile head, thus establishing the classification in economic classes A1, A2, B1, B2, C, D and E.

⁴ It is important to note that every three months the databases can be replaced by more up-to-date versions. For example, the service request status can be updated with the most current information. In addition, requests may be reclassified by public service providers with more accurate information, as well as may be forwarded from one agency to another

⁵ The "Integration" service channel contains requests registered through the Integrated Systems SP156 - Military Police and Traffic Engineering Company (CET). It should be noted that the records of requests through the SP156 Integrated Systems were discontinued in December 2017 for Military Police and in June 2018 for CET, so that the requests were only referring to

667,796 service requests. For the purpose of comparison, São Paulo City's population, according to the 2010 Census, was just over 11.2 million people, that is, the number of service requests is equivalent to 5.96% of the population, and the district that presented, proportionally, fewer requests was "Cidade Tiradentes", with the equivalent of 2.21% district's population. In this way, it can be inferred that the average income of the people who requested the service tends towards the district's average income.

Data referring to São Paulo districts' income was obtained through download from IBGE's website [9] and the most recent available data corresponded to the 2010 Census. As IBGE data is detailed by Census enumeration area⁶, it was necessary to group such data by city district, in order to allow the information to be cross-checked with the SP156 service center records. Thus, the mean values of the monthly average nominal income of the persons responsible for permanent households, with and without income, were calculated being grouped by district.

Quartile nominal income average grouping analysis considers: Quartile 1, districts whose citizens have an average income equal to or less than R\$ 1,172.00⁷; Quartile 2, districts whose citizens have an average income between R\$ 1,172.01 and R\$ 1,676.80; Quartile 3, districts whose citizens have an average income between R\$ 1,676.81 and R\$ 3,293.50; and Quartile 4, districts whose citizens have an average income equal to or greater than R\$ 3,293.51.

It is important to note that it was not possible to carry out personal requesting analyses, since the available data is related to the service request, and not to the person who requested it. This would be an interesting analysis, since the results from other research show differences in the use of e-government by men and women (69% and 59% respectively), by education level, ranging from 26% for illiterate people to 85% for university graduates, by age group and social class [17].

The cross-checked information from Central SP156 records and IBGE's socio-demographic data was carried out using the software Excel version 365, considering the "District" column in the records of Central 156 and column "Nome_do_distrito" in the IBGE database. Minitab version 18 was used as supporting software for statistical analysis, considering confidence intervals of 95% for the mean, and the individual standard deviations were used to calculate the intervals.

For data presentation and representation purposes, service channels will be referenced in figures and tables as follows: Application SP156 will be treated only by SP156 App; Central SP156 will be denominated Call Center; Portal of Service SP156 will be treated as Web Portal; and for Service Centers the nomenclature is maintained.

registrations made by citizens. As the purpose of the paper is to analyze the attendance of the districts of the city of São Paulo to the records made by citizens, it was decided to exclude "Integration" data from the database analyzed.

⁶ Census sector is a territorial unit for census operations' collection, as defined by IBGE.

⁷ R\$ 1.00 is equivalent to US\$ 0.26, according to the trading price of 3/15/2019.

4 THE SP156

With the proposal of modernizing the services offered through the 156 phone number, citizen service center, the City of São Paulo launched, in December 2016, the reformulation of the Service Portal SP156⁸, and the SP156 App as new service channels for citizens. Thus, the population of the city of São Paulo now has two online channels⁹ for requesting services from City Hall, as well as the SP156 call center and on-site Service Centers.

In addition to the expansion with two new platforms for service requests, the reformulation of the citizen service center ensured that its design was intuitive, and that the language used was simpler. Through the new platforms available, citizens can attach images to their requests, as well as evaluate the platforms and the services performed by the public authority. However, not all services can be requested online.

The Citizen Service Centers' modernization was one objective of the 2013-2016 Goals Program¹⁰¹¹ [22]. The expansion of online services is one of the lines of action of the current management of the City of São Paulo; and one of its goals is to reduce the average service time of the five main services requested from 90 to 70 days, in relation to the last four years," as one of the lines of action to expand the "number of online services available in the Service Portal SP156" [23].

4.1 Data Analysis and Discussion

When analyzing citizens' preference by channel type used to make the request (**Fig. 1**), it is verified that Central SP156 is the most used channel for requests, being

⁸ The City of São Paulo provided online services through the Citizen Assistance Service (SAC), which was deactivated in November 2016, with the launch of the new Service Portal SP156. One of the modifications was in relation to the language used, to be simpler for the citizens, the inclusion of evaluation of both the service channels and the services, as well as the availability of the data referring to the requests, used in this research.

⁹ Registration is not mandatory to use SP156 channels, that is, it is possible to request a service anonymously. The advantage that the platforms offer to the citizen signed up is the greater facility in request follow-up and in the City Hall contact that can be established with the citizen. Thus, while anonymous requests must be accompanied by the protocol number, those requested by a signed-up person will be concentrated in the Service Portal SP156 and/or the App SP156.

¹⁰ According to the São Paulo Targets Program Law - Amendment no. 30 of the Organic Law of the Municipality of São Paulo - since 2008, the elected mayor is obliged to present the Management Targets Program within 90 days after possession.

¹¹ Amendment No. 30 changes the wording of Article 69 of the Organic Law of the Municipality of São Paulo, specifying that the Program of Targets "(...) will contain the priorities: strategic actions, indicators and quantitative targets for each of the sectors of the Municipal Public Administration, City Districts and Districts, observing, at a minimum, the guidelines of its electoral campaign and the objectives, guidelines, strategic actions and other norms of the Law of the Strategic Master Plan".

responsible for 64.62% of total recorded occurrences, followed by Service Portal SP156, with 22.82%, by the SP156 App, with 6.15% and, finally, by Service Centers, with 6.41%.

The preference for Central SP156 can be explained by the fact that, for a long time, the only way for municipal services to be requested was exclusively by telephone and it was also established that the contact number would be the same for all municipalities¹². Thus, in people's minds, the action of contacting 156 is an activity restricted to the phone call.

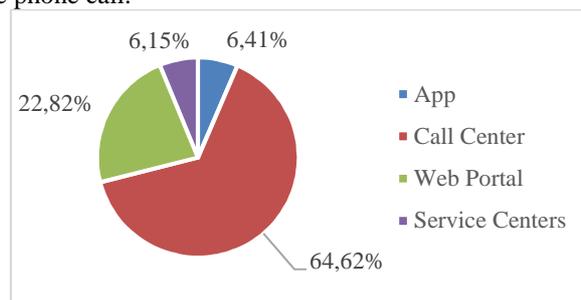


Fig. 1. Channel usage by type (n = 667,796).

However, this distribution does not happen uniformly, depending on the district. The districts that had the most requests registered by the SP156 App were Cursino (17.46%), Vila Leopoldina (13.98%) and Itaim Bibi (12.57%). On the other hand, the districts that had more registrations through the Service Portal SP156 were Tucuruvi (70.39%), Vila Sônia (40.01%) and Vila Mariana (36.69%). Considering Central SP156, Brás (88.89%), Sé (87.88%) and Belém (82.60%) were the districts that used this channel the most. Concerning the Service Centers, the districts with the highest number of requests for such a channel were Marsilac (34.07%), Parelheiros (28.94%) and Perus (19.97%).

The difference of the monthly average income of the districts by type of service channel used should be noted. The three districts that made the most applications for the SP156 App had an average income above R\$ 2,500.00 (Cursino with R\$ 2,566.82, Vila Leopoldina with R\$ 5,130.97 and Itaim Bibi with R\$ 6,384.04), and the districts that used the most Service Centers presented monthly average income under R\$ 1,000.00 (Marsilac with R\$ 665.74, Parelheiros with R\$ 747.13 and Perus with R\$ 966.26).

Nine types of services account for more than 50% of the services requested when analyzing the most demanded services by citizens (Table 1), with "Social Service for Homeless People" (12.49% of requests) and "Pot-Hole Repair" (10.74% of requests) respond to almost 1/4 of the requests registered by citizens.

¹² National Telecommunication Agency (Anatel) resolution no. 357 of March 15, 2004, standardized the codes for Public Utility and Support to the Switched Fixed Telephone Service (STFC), with the number "156" for municipal services.

Table 1. Most requested services

Service	App	WEB Portal	Call Center	Service Centers	Sum
Social Approach to Homeless People	0.16%	0.12%	12.21%	0.01%	12.49%
Pot-hole repair	2.06%	3.13%	4.81%	0.74%	10.74%
Tree assessment and services in public areas	0.38%	1.20%	4.29%	1.04%	6.91%
Removal of vehicle / carcasses abandoned on public roads	0.54%	0.91%	2.36%	0.18%	3.99%
Removal of large objects on public roads	0.03%	0.44%	3.36%	0.09%	3.90%
Removal of debris on public roads	0.05%	0.72%	2.90%	0.12%	3.79%
Noise pollution complaint	0.71%	0.98%	1.56%	0.14%	3.40%
Trimming of squares, beds and stream banks	0.17%	0.65%	2.22%	0.27%	3.31%
Complaints	0.00%	0.57%	2.66%	0.21%	3.24%
Other services	2.32%	14.09%	28.26%	3.56%	48.23%

The type of service requested also varies according to the service channel (**Table 1**). When considering SP156 App, the most requested services were "Pot-hole repair" (2.06%), "Noise pollution complaint" (0.71%) and "Removal of vehicle / carcasses abandoned on public roads" (0.54%), with these three services representing more than half of the requests made by the citizens who used the app.

Regarding the other service channels, type of service requested is distributed in a more dispersed way, with the sum of the three most requested in the range of 30% or less of the proportion. The "Pot-hole repair" service (3.13%) was the most demanded by the citizens who used the Service Portal SP156, "Service of Social Approach to Homeless People" (12.21%) was the most demanded by citizens who used the Central SP156 and "Tree assessment and services in public areas" was the most requested by the citizens who used the Service Centers. It should be noted that this last service can be requested through the other three service channels.

The "Pot-hole repair" service was the only one that appeared among the three most requested on all channels, with 2.06% of the requests through the SP156 App, 3.13% of the requests through the SP156 Service Portal, 4.81% through Central SP156 and 0.74% through the Service Centers.

Fig. 2. shows an interval plot of districts average income according to the service channel usage. It is noted that the service request for districts made through the SP156 App had an average income of R\$ 2,876.60, those who used the SP156 Service Portal had an average income of R\$ 2,658.70, those who used the SP156 Central had an average income of R\$ 2,360.50 and those who used the Service Centers had an average income of R\$ 1,911.50. The difference of means was statistically significant ($p < 0.001$) with a significance level of 0.05 according to the analysis of variance (ANOVA) conducted.

Furthermore, when analyzing the correlation between the percentage of use of the service channel by districts and the average income of the districts, it is verified that there is a statistically significant correlation ($p < 0.001$) for all channels, with a correlation coefficient (r): 0.55 for SP156 App; 0.42 for the Service Portal SP156; -0.30 for Central SP156; and -0.40 for Service Centers.

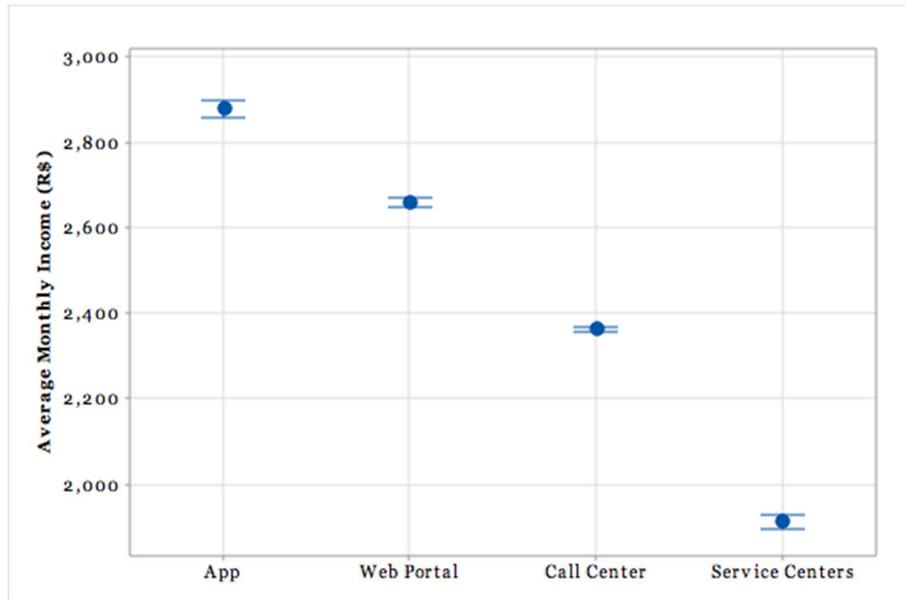


Fig. 2. Interval plot of the average income of the districts grouped by service channel

Correlation analysis, together with the variance analysis, indicates that citizens who live in districts with a higher average income tend to prefer to use the App or the Web Service Portal SP156, and citizens who live in districts with a lower average income tend to prefer to use Central SP156 or the Service Centers. Or, by making the inverse analysis, the lower the district's average income, the higher the Service Centers and Central SP156 usage tends to be, and the higher the district's average income, the lower the use of these service channels tends to be.

Table 2 presents the three most requested services by the citizens considering the quartiles grouping of middle income of the district; it is possible to notice the little variation in the services requested by the citizens of Quartiles 2, 3 and 4. In these quartiles, the presence of the "Service of Social Approach to Homeless People" was observed, a service that for Quartile 1 appears only as the sixth most requested, with 3.89% of requests.

The largest number of requests for "Service of Social Approach to Homeless People" could be explained by the tendency for more people to be living in street conditions in higher-income, more generally middle-income neighborhoods in more central areas of the city, or even that the presence of people in such a situation becomes more "noticeable" in districts with higher incomes. Still considering Table 2, for the citizens in Quartile 1 the presence of "Removal of large objects on public roads" among the three most requested services was verified.

Table 2. Most requested services grouped by income quartiles

Quartile	Service	Percentage
	Pot-hole repair	11.18%
Quartile 1	Tree assessment and services in public areas	6.19%
	Removal of large objects on public roads	5.48%
	Service of Social Approach to Homeless People	16.08%
Quartile 2	Pot-hole repair	11.21%
	Tree assessment and services in public areas	6.36%
	Service of Social Approach to Homeless People	14.97%
Quartile 3	Pot-hole repair	11.57%
	Tree assessment and services in public areas	6.60%
	Service of Social Approach to Homeless People	14.97%
Quartile 4	Pot-hole repair	9.08%
	Tree assessment and services in public areas	8.65%

5 Conclusion

The purpose of this paper was to analyze the usage profile of the SP156 service channels of the City of São Paulo. To do so, the databases of the public service requests, made available through the Open Data Portal of the City of São Paulo, and the socio-demographic data of the districts of the city, made available by the Brazilian Institute of Geography and Statistics were used.

Nine types of services requested by citizens (**Table 1**) correspond to more than 50% of the requests made. In addition to identifying the most requested services in the city, it was possible to identify the most requested services by type of service channel – the only service that is one of the main services for the four service channels is “Pot-hole repair”.

The analyses also allowed us to identify that there is a statistically significant difference in how citizens of districts with different income brackets make their requests. People with higher incomes tend to prefer digital channels (App and Web Portal) for their service requests, whereas people with lower incomes tend to prefer more conventional service channels (Call Center and Service Centers). That is, it is not enough for the government to create digital channels for requesting services, based on the digital by default idea, since this may generate new exclusions of people who are already socially excluded. This finding corroborates studies that show the importance of considering the territory in decision making [17], and of offering different means to register requests, without presuming the digital by default characteristic [26]. Future studies could further analyze the data on the usage profile of individuals by district of the city considering devices used, Internet use, use of e-government, for example. This information could help with local government decision-making so that they could better understand what it takes, for example, for citizens from lower middle-income districts to opt for Central SP156 or Service Centers.

In addition, by analyzing the user profile of each service channel, it would be possible to make adaptations that would better serve a specific audience, such as alternative

service schedules, understand the reasons that lead people to choose to use one platform instead of the other, or if there is, for example, a stage in the process that somehow causes people to prefer one platform over another. In this context, the opinion of those who use and those who do not use the channel(s) is of the utmost importance and their inclusion in stages of the process can mean more effective direction of efforts. Understanding the usage profile of each platform and the profile of those who use each platform may mean, for example, minimizing stories such as those reported at the beginning of this article.

A limitation of the analysis is the inference of people's average income who requested services as being equivalent to the district's average income. Additionally, it is important to acknowledge that the requests sample, despite being large enough, is non-parametric. In addition, it has been inferred.

Finally, it is recommended that, for public policy and future research purposes, the databases be made available with other sociodemographic breaks, such as the gender and age of the requesting person, respecting and following the privacy and data protection policies, ensuring data anonymity. Also, it would be valuable to analyze the data from other cities and citizens, in order to understand how this phenomenon occurs in other contexts.

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