Analysis of ISO 37120 indicators for small municipalities in Brazil: a case study in Piumhi

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Abstract. Brazil does not have a city which has reported to the International Standard ISO 37120 (Sustainable cities and communities - indicators for city services and quality of life) neither has available results on the World Council on City Data (WCCD) data bank. Furthermore, the country is facing an important set back on discussions about environmental and sustainable development issues. Piumhi, with approximately 38 thousand inhabitants and a mostly agricultural economy, is now getting started towards a sustainable future. In this scenario, this paper aims to verify Piumhi’s current status towards locally accomplishing the UN Sustainable Development Goal (SDG) 11: Sustainable cities and communities. Thereby, it aims to help design a strategy for the city to meet the referred SDG by the 2030 deadline. In order to reach this purpose, the authors qualitatively analysed open data provided by public agencies. The results indicate that Piumhi is not responding to the above-mentioned guidelines as expected. Therefore, effective actions must be put into practice to assure the SDG 11 fulfilment. Finally, the authors suggest that new researches are made in order to list the opportunities and ways so Piumhi and similar cities get their passport into a resilient future. Thus, Brazil and other developing countries can become sustainable nations.

1. Introduction

According to the UN, there will be 41 megalopolises worldwide with more than 10 million inhabitants by 2030. However, the current occupation rate of cities, besides not being inclusive is extremely disorganized. First because not every people have access to housing and people are allocated in inadequate spaces. Either because they are at areas of risk of landslides or flooding, whether due to the lack of basic sanitation, lighting, among other infrastructure conditions [1].

One of the biggest challenges for cities is to establish sustainable development, ensuring harmony between environmental, social and economic aspects. In developing countries, this can be a major stalemate as those countries are marked by great social inequality and advanced environmental degradation [2].

In order to guide and evaluate the management of urban services performance and quality of life in cities, the International Standard ISO 37120:2014 ‘Sustainable Development of Communities - Indicators for Urban Services and Quality of Life’, establishes a holistic and integrated approach to the urban environment for sustainable development and resilience. To this end, the ISO has indicators that give a uniform approach to what is assessed, as well as how the indicators should be measured [3].

In this context, SDG 11 ‘Making cities and human settlements inclusive, safe, resilient and sustainable’ aims that all countries enable an inclusive and sustainable urbanization and the capacity for participatory, integrated and sustainable settlement planning and management.

Piumhi is a municipality in the state of Minas Gerais, Brazil, with an estimated population of 34,690 inhabitants (2019). It has agriculturally based economy, in which stand out the production of coffee, corn, beans, milk and derivatives as well as beef cattle. Cities in Brazil with less than 40 thousand inhabitants represents 85% of total 5570 cities [4], they usually miss experts in their manpower to monitor, obtain, treat, attend and report data, what makes them more dependent of federal institutions.
2. Materials and Methods
This article evaluates the availability of online data from the municipality of Piumhi, Brazil, to attend with the International Standard ISO 37120:2014. The database considered for this study is available on the internet and is provided by the Brazilian Institute of Geography and Statistics (IBGE), as this is the main institution with attributions related to geosciences, social, demographic and economic statistics, which includes conducting censuses and organizing the information obtained from them.

To enable this analysis this work developed a brief review of the ISO 37120 and collected the data available on the internet at the IBGE’s website. The data was organized according to the referred indicators with potential relationship, however the quality of the data collected was not analysed.

After analysing the compatibility of the data to core and supporting indicators or to profile indicators, the study quantified the amount that reach each case.

In sequence, a superficial analysis was performed aiming to give directions for further studies and to guide the public government about how to obtain data to attend the ISO 37120 and the World Council on City Data.

It is important to mention that the ISO 37120:2014 edition was revised and replaced by the ISO 37120:2018, which due to availability reasons was not used for the purpose of this work.

3. Results
The ISO 37120 indicators are structured around themes according to the sectors and services provided by the city and divided into core and support indicators. Core indicators are considered essential to guide and assess the performance of services provided and quality of life. Support indicators should be submitted to the International Standard in order to promote best practices. Profile indicators provide basic statistics and background information to help cities determine which cities are of interest for comparisons [3].

The core and supporting indicators of the ISO 37120 are essential for assessing and guiding the management and performance of city services. They are classified into 17 themes according to different sectors and services [3].

Due to the indicator’s consistency and comparability over time and from one city to another, this International Standard allows to monitor the evolution of cities performance. Moreover, in addition to comparing a range of measures, ISO 37120 enables the sharing of experiences and good practices between cities. Thus, it contributes to the planning of the city of the future by considering the current use of resources and their efficiency [3].

The ISO 37120 topics are listed and briefly described [3]: Economy (1): assess the health of the city's economic system by the percentage of the population living in poverty, the full-time employment rate, the youth unemployment rate, the level of economic activity and the technological innovation index. Education (2): address the issues of educational opportunity, indicating how widespread formal education is in the city among the school-age population. Energy (3): take into consideration the consumptions of electricity, given that the electric service is an indicator that contributes to the sustainability, resilience, economic productivity and health of the city. Environment (4): to evaluate the rates of particulate and gaseous pollutants dispersed in the atmosphere. The indicators also address the city's adverse contribution to climate change. Finance (5): measure the quality of financial management, fiscal health and the level of dependency of the municipality, as a percentage of debt income, capital reinvestment rate, percentage of total revenue from own sources and tax collection as an important source of income. Response to fire and emergencies (6): implies protection of the life and heritage of its inhabitants and indicates level of protection against fire and emergencies. Governance (7): consider the level of voter participation and the degree of interest of the population in local government. Health (8): the average life expectancy of the population is analysed, which reflects the overall mortality level and health conditions. Recreation (9): gives the importance of recreation for urban life, in terms of its contribution to people's health and the vitality of the city. Security (10): the general level of security in the city, the effective police force in crime prevention, the perception of personal security, the number of criminal offenses against third party property, which directly affect
possible investments and incentives. **Housing** (11): measure the number of people living in precarious and unsafe housing from the percentage of slums. **Solid waste** (12): the population's access to solid waste collection, the amount of waste that is produced, as well as the final disposal of it. **Telecommunications and innovation** (13): information access, communication technology connectivity and level of innovation. **Transport** (14): measure the size of public transport networks and cycle paths, the flexibility of this system, how ease is to use the public transport and the urban form. **Urban planning** (15): analyse the existing green space area and the number of trees planted annually. In the housing aspect, it assesses the city's challenges to meet the demands and needs for formal housing. **Wastewater** (16): evaluates the population's access to the wastewater collection service and the percentage of untreated sewage produced by the city. **Water and sanitation** (17): assess household and total water consumption per capita, population access to drinking water supply, sustainable access to an improved water source, suitable for consumption, with 20 litters per person per day and from a source within a radius of one kilometre.

The data obtained from the IBGE web platform are enough to answer 16 of the 100 core and supporting indicators of the International Standard ISO 37120. As for the profile indicators used to characterize the cities, the data provided by IBGE are enough to answer 21 of the 39 indicators. These data evidence the low rate of indicators attended by IBGE, even for profile indicators, which has only 54% of the indicators made available.

When these numbers are compared nationally, the rate of attendance even by bigger cities is very similar to Piumhi. That is because the IBGE censuses and surveys are standardized throughout the country and occurs in every municipality, so IBGE data is uniform for the most Brazilian cities. Globally, some differences are noticed, the Table 1 below shows the number of cities classified by the Word Council on City Data (WCCD) in each level, 88% out of 139 cities has reported more than 76 indicators. It represents a much higher rate when compared to Brazilians cities, where approximately 16 indicators would be reported.

| Certification Level | # Cities | % Cities | Indicators reported |
|--------------------|---------|----------|---------------------|
| Aspirational       | 15      | 11%      | 30 - 45 Core indicators |
| Bronze             | 1       | 1%       | 46-59 Indicators (46 Core + 0-13 Supporting) |
| Silver             | 1       | 1%       | 60-75 Indicators (46 Core + 14-29 Supporting) |
| Gold               | 12      | 9%       | 76-90 Indicators (46 Core + 30-44 Supporting) |
| Platinum           | 110     | 79%      | 91-100 Indicators (46 Core + 45-54 Supporting) |

The Figure 1 shows the quantity of core and supporting indicators that are available for each theme. We can notice that the biggest number of indicators are for the themes “Economy” and “Health”, but even for these cases, we still have a low rate of achievement. Other negative example is for the theme “Recreation”, for which we have 2 supporting indicators and only 1 with data available. This analysis shows how poor is the culture of keeping data updated in the country, especially in small cities like Piumhi.
Figure 1. Data availability at IBGE to meet core and supporting indicators of ISO 37120.

4. Conclusion

The compilation of the data available for Piumhi shows a low rate of core and support indicators (16%) to attend the ISO 37120 and the World Council on City Data (WCCD). This denotes that, probably, the public managers have taken decisions based on perceptions or in local data, once the mainly Brazilian institution in charge of producing data doesn’t support their decisions. Once this lack of data comes from a national institution, probably this happens in most cities in the country.

The themes “Energy”, “Environment”, “Finance”, “Fire and emergency response”, “Governance”, “Safety”, “Solid waste” and “Telecommunication and innovation” has none of the indicators data provided by IBGE. It means that the cities who decided to report them, must provide them by itself, what can become a huge challenge due to the complexity of monitoring and compiling data of different areas of the public management system. When we focus on medium or small cities of developing countries, it is a bigger challenge due to their deficiency of keep team of experts to do the job with quality.

One solution would be to stablish partnerships and to delegate to academic institutions these data monitoring, generating and reporting. This could guarantee that the data would be obtained using assertive methods, ensuring the data quality and quantity. The necessary infrastructure could be provided through foundations and institutions of scientific development support.

The ISO 37120 indicators allows tracking and monitoring progress on city performance, in order to attend and achieve the UN “Urban” Sustainable Development Goal 11 ‘Make cities and human settlements inclusive, safe, resilient and sustainable’. Once indicators have a holisitic approach of measurements for performance, learning from one another and supporting policy development and priority setting. For a sustainable development, the whole city system needs to be taken into consideration. Planning for future needs should take into consideration current use and efficiency of resources in order to better plan for tomorrow.

That is why keeping these data updated and reporting to the ISO 37120 and WCCD can bring significative gains to the public management, once the indicators with good data reported could improve the decision-making process, returning better public policy for the community.

References

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