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Evaluation of the Sustainable Development Index in Brazil: Measuring Progress Towards a Sustainable Future

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Abstract: The study aims to examine the Sustainable Development Index of Cities-Brazil (IDSC-BR) for 2023 regarding the achievement of Sustainable Development Goals (SDGs) in the 26 Brazilian capitals. We employed a quantitative approach, descriptive statistics, and a qualitative approach to understand the nuances and implications associated with the performance of capitals in the various dimensions covered by the index. The results highlight that, despite limitations such as incomplete and outdated databases, the IDSC-BR is a valuable tool for analyzing the SDGs locally, underscoring the need for public policies adapted to local realities. The analysis of all centers' capitals reveals that much work remains, as capitals have yet to reach high levels of sustainable development. Additionally, there has been an overall setback in the index compared to 2022, with the Northern region being the most challenging due to the low results achieved.

Key words: sustainable cities, development index, Brazil, Agenda 2030, sustainable development goals
JEL codes: O13, R11, Q56

1. Introduction

In 2015, the introduction of the Sustainable Development Goals (SDGs) as part of Agenda 2030 marked a milestone that Veiga (2020, p. 27) regards as "a decisive step in legitimizing sustainability as a new value". The SDGs incorporate three crucial dimensions: economic, social, and environmental. Comprising 17 goals, broken down into 169 specific targets and 231 indicators, they cover a wide range of issues, from eradicating poverty to promoting gender equality, ensuring quality education to taking climate action, and demonstrating a comprehensive commitment to sustainable development in all its facets.

Although there are multiple definitions of sustainable development, there is consensus regarding its complexity, uncertainty, and multidimensional nature. Thus, achieving the SDGs demands significant social transformations that require substantial fiscal expenditures, private investments, and an efficient monitoring and control system to evaluate the progress and impacts of actions towards these goals (Kemp & Martens, 2007).

Sachs et al. (2023), in the most recent edition of the Sustainable Development Report, point out that from 2015 to 2019, progress on the SDGs was below expectations, a situation exacerbated by the pandemic and multiple crises that resulted in global stagnation. Besides the financial issues related to meeting the SDGs by the

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stipulated deadline, the report also highlights the need for countries to review their national strategies and invest more in statistical capacity and data understanding to support the long-term trajectory for the main SDG transformations.

The Bertelsmann Stiftung (BS) and the Sustainable Development Solutions Network (SDSN) developed the SDG Index based on the SDGs. However, according to SDSN (2023), the 2023 edition compiled 97 indicators to assess progress towards Agenda 2030, disregarding approximately 60% of the SDG indicators due to a lack of available data. The gap between global aspirations and local realities appears in the cities index, which faces challenges similar to those of their national counterparts.

To address local specificities and promote the implementation of the SDGs at the municipal level, the SDSN developed the Sustainable Development Index of Cities-Brazil (IDSC-BR). This index, sensitive to local nuances, aims to fill the gaps observed at the national level by providing a more comprehensive evaluation adapted to the specificities of Brazilian cities.

The study aims to examine the IDSC-BR concerning the fulfillment of the SDGs in the 26 Brazilian capitals. The analysis seeks to understand the current situation of these cities regarding SDG compliance, both in comparison with other capitals in their regions and on a national scale. To achieve this goal, the study adopts a quantitative approach with descriptive statistics and a qualitative approach to explore the nuances and implications of the capital's performance across the various dimensions covered by the index. The study takes an exploratory perspective, outlining descriptive and explanatory approaches. The data to be analyzed were collected from the IDSC-BR website, referring to 2023.

This research will contribute to a deeper understanding of Brazil's progress towards the SDGs and provide new insights into how to advance towards sustainable development. This analysis may serve as a basis for future policies and actions to help the country fulfill its commitments and goals toward a more sustainable and inclusive future. In addition to this introduction, we divided the article into four parts: theoretical framework, methodological procedures, analysis of results, and final considerations.

2. Theoretical Framework

2.1 Sustainable Development

The idea of sustainable development, which proposes integrating the environment with the development process, was consolidated in the report "Our Common Future", produced by the World Commission on Environment and Development (WCED), known as the Brundtland Report. This document introduced the term "sustainable development", defining it as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

The concept of sustainable development presented by Brundtland in 1987 has become widely used. According to Lavall and Olsson (2019, p. 61), "Since it implies a desirable ethical commitment of present generations to future ones, it became known as 'intergenerational'".

In addition to widely disseminating this concept, the Brundtland Report played a significant role in promoting practices that balance economic, social, and environmental aspects of development. Its influence notably extended to global policies and discussions related to sustainability in the years that followed (Kemp & Martens, 2007).

The growing importance of issues related to sustainable development led the United Nations (UN) to fully

incorporate this theme, making it the focus of various conferences. Rio 92 is considered the most emblematic due to its political relevance. Among the legacies of this conference is the creation of Agenda 21. From this point on, sustainable development began to be characterized as a political meta-objective that integrates environmental, economic, social, and political-institutional measures capable of promoting the well-being of people and the planet (Lavall & Olsson, 2019).

Although this multidimensional notion of sustainable development emerged with Agenda 21, it was only in Agenda 2030 that it became clear, as it outlined 17 Sustainable Development Goals (SDGs) that incorporate the three dimensions: economic, social, and environmental (Lavall & Olsson, 2019).

The SDGs rest on non-legally binding commitments, meaning the UN cannot enforce their adoption since no legal obligation exists regarding the SDGs. Therefore, success in their implementation on a macro scale will depend on the voluntary adherence of signatory countries. In this context, developing metrics, establishing monitoring systems, and standardizing and verifying data are vital in determining how countries implement the SDGs and whether individual cities will succeed (Koch & Krellenberg, 2018).

2.2 Sustainable Development Goals (SDGs)

The UN's Agenda 2030 for Sustainable Development consists of an action plan composed of 17 Sustainable Development Goals, defined during the 2015 United Nations Summit on Sustainable Development and in effect since January 2016. "The Sustainable Development Goals are a global call to action to end poverty, protect the environment and climate, and ensure that everyone everywhere can enjoy peace and prosperity (UN Brazil, 2015).

The annual SDG Index has shown modest progress (Figure 1); between 2015 and 2019, it increased from 64% to 66%, respectively. The advancements among countries and the progress at regional and local levels could be more balanced. With the advent of the pandemic, progress stabilized, remaining below 67% in 2022, with only limited progress observed in environmental and biodiversity goals. In addition to the impacts of the pandemic, geopolitical instability exacerbates the challenges faced in achieving the Agenda 2030 (Sachs et al., 2023).

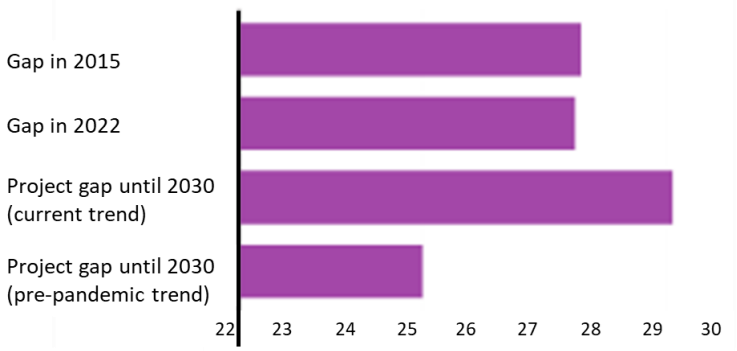


Figure 1 Sustainable Development Goals, Agenda 2030 – UN.

Source: Adapted from Sachs et al. (2023). Note: The projected gap until 2030 - based on the extrapolation of the annual growth rate of the SDG Index during the period 2019-2021. The projected gap before the pandemic relies on extrapolating the annual growth rates of the SDG Index from the 2015-2019 period.

Upon analyzing the progress of the 17 SDGs individually, it becomes evident that achieving them globally within the set timeframe is unlikely. Additionally, estimates suggest that only 18% of the targets will be met worldwide by 2030. The study highlights that another obstacle is the complexity of the measurement and monitoring process, as data infrastructure either does not exist or needs to be updated when present (Sachs et al., 2023).

Brazil's most recent Voluntary National Review (VNR) dates back to 2017. The government has endorsed the implementation of the SDGs through official statements and has sought to integrate the SDGs into sectoral action plans, as well as through a national strategy, demonstrating a comprehensive approach to incorporating these goals across various areas. However, there needs to be an explicit mention of the SDGs in budget documents, which may indicate a possible gap in integrating these goals into the financial aspects of government (Sachs et al., 2023). A new review is being prepared and is scheduled for presentation in 2024 at the UN High-Level Political Forum (IPEA, 2023). When available, this document will provide an updated view of Brazil's actions towards fulfilling the Agenda 2030.

In 2023, the government reinstated the National Commission for the SDGs with government and civil society representatives. Its goals are to contribute to the internalization of Agenda 2030 in the country, stimulate its implementation at all levels of government and among civil society, and monitor, disseminate, and ensure transparency regarding the actions taken to achieve its targets and progress toward the SDGs (MEC, 2023). In 2023, Brazil ranked 50th on the SDG Index, scoring 73.7, highlighting challenges and areas for improvement (Sachs et al., 2023).

Given the analysis of the annual SDG Index, which reveals modest progress in achieving the Sustainable Development Goals (SDGs), it is imperative to deepen our understanding of how achieving the SDGs is intrinsically linked to the need for adjustments in governmental structures that play a crucial role in overcoming these challenges and effectively implementing Agenda 2030.

2.3 Sustainable Development Goals (SDGs) and Government Structures

In 2017, the OECD officially launched a new policy research and knowledge-sharing project to deepen understanding of the institutional arrangements addressing the SDGs, explore the inherent challenges, and test innovative solutions.

One challenge this project identified in implementing the SDGs is ensuring effective governance and coordination structures between government bodies and levels. This process requires difficult concessions from those involved to balance sometimes conflicting objectives and targets.

Over time, government institutions have been developed and designed to address challenges through a top-down system. However, countries are still experimenting with the best way to meet the 2030 agenda, requiring the development of new forms of cooperation between the public sector, private sector, and civil society through alliances that facilitate relationships among stakeholders, promoting engagement and commitment. This will necessitate a shift from traditional political tools to more open ones that allow for experimentation and citizen feedback, highlighting the need for cultural changes, not just technical ones (OECD, 2017).

The countries present have recognized challenges in achieving the SDGs, including establishing a permanent and multisectoral coordination structure. Examples, such as those from the Netherlands and Mexico, highlighted the importance of enabling the coordination of efforts both horizontally and vertically. As a result, local needs are aligned with global aspirations and become prioritized (OECD, 2017).

In the context of the SDGs, it is crucial to articulate, beyond the political component, shared monitoring and management strategies involving federal entities, civil society, and the private sector. These strategies should ensure active participation at all levels, promoting the implementation of local, regional, and national initiatives with the necessary technical support (Cruz et al., 2022).

Sustainability involves globally sustainable and locally appropriate options, considering contextual and behavioral awareness. It also seeks to explore and challenge established perspectives, guiding and informing action processes to achieve specific outcomes. Paying attention to local cultures and community-based decision-making is emphasized. Thus, open definitions allow for identifying sustainability programs and actions that address local concerns, involve various actors, and promote locally adapted solutions (Kemp & Martens, 2007).

2.3.1 Main Challenges Related to Measuring the SDGs

Monitoring and reporting on the progress toward achieving the SDGs still need help, such as the absence or delay of necessary data, particularly in developing or underdeveloped countries where governance is often more limited. “The availability of quality data is crucial for the periodic production of indicators, and they must be accessible, up-to-date, reliable, and disaggregated, based on official national sources” (Cruz et al., 2022).

Limitations in the statistical data necessary for adequate monitoring and reporting of the SDGs persist. In this context, Cruz et al. (2002), in their study on monitoring the SDG targets in Brazil, highlight the need for cross-sectoral initiatives to build networks involving the entire Brazilian society. The authors emphasize the need to combine information beyond the analyzed sector and the fragmentation and irregularity in data production as significant obstacles to producing indicators, directly impacting the monitoring of the SDGs.

Technological advancements provide greater flexibility in data selection, allowing for the reformulation of global metrics to make them more consistent (SSDN, 2023). Given technological innovations, systematic methods that enable the integration of geospatial and statistical analyses to address data scarcity are needed (Albuquerque de Melo et al., 2023; Liu et al., 2023).

2.3.2 Contextualizing the SDGs at the Local Level

In analyzing the international scientific production on the interrelations between cities and the SDGs, Albuquerque de Melo et al. (2023) emphasizes the importance of this topic. They highlight that SDG 11 — Sustainable Cities and Communities specifically addresses this issue, which is intrinsically related to at least 11 other SDGs. Additionally, they note that city-level assessments cover approximately one-third of the 231 indicators proposed by the UN.

Unlike the MDGs, the SDGs require national, regional, and local implementation. In this context, cities are crucial to their implementation (Koch & Krellenberg, 2018). Given cities' significant influence on sustainable development, the success or failure to achieve these goals may be decided in urban centers (Albuquerque de Melo et al., 2023).

The change in scale has led to considerable challenges, including data collection, indicator development, and subsequent monitoring (Koch & Krellenberg, 2018). To assist in the implementation and promotion of the SDGs at the local level, where political changes and proper resource allocation are also crucial for their achievement, the SDSN developed the Sustainable Development Index for Cities – Brazil (IDSC-BR). This tool aims to: (1) guide the political actions of mayors; (2) establish references and targets based on indicators and facilitate the monitoring of the SDGs at the local level; (3) help cities analyze their performance based on the SDGs; and (4) provide the necessary inputs for the preparation of the Local Voluntary Review (LVR), thus facilitating the exchange of experiences, the mobilization of partnerships, and the strengthening of policies and government institutions (IDSC-BR, 2017).

2.4 Sustainable Development Index for Cities–Brazil (IDSC-BR)

Considering the need to understand the IDSC-BR for a better analysis of its results, this section presents a summary of the methodology involved in its creation, developed by the Instituto Cidades Sustentáveis under the Sustainable Cities Program, in partnership with the Sustainable Development Solutions Network (SDSN).

Since its conception, the IDSC-BR has outlined specific objectives covering various dimensions of public management and sustainable development in Brazilian municipalities. It aims to communicate technical information in an accessible manner so that public managers can assimilate the employed methodology and understand its application.

Additionally, it seeks to systematically present the main challenges municipalities face, providing a clear view of the local reality. Evaluating the performance of services and public policies places greater responsibility on local governments to achieve the SDGs.

The index seeks to consolidate data and statistics related to the SDGs, providing a solid foundation for analysis. Proactively, it encourages technical bodies and managers to address gaps and produce and integrate new data sets, contributing to continuous improvement. The construction logic of the IDSC-BR is similar to that of the SDG Index; however, to better suit the local context, the IDSC-BR uses a set of indicators specially adapted to the priorities of Brazilian cities, leveraging local data produced within the country, which are often not usable in international assessments.

Like the SDG Index, its methodology undergoes peer review, with the European Commission's scientific body conducting the audit. In 2023, the IDSC-BR included 100 indicators from public and official national sources, except for two indices related to SDG 13 — Climate Action, which used data from other sources[1] (Table 1).

Table 1 Indicators Comprising the IDSC-BR (2023).

Nº	SDG	Indicator
1	1	Families registered in the Cadastro Único for social programs (%)
2	1	Percentage of people registered in the Cadastro Único receiving Bolsa Família (%)
3	1	Percentage of people below the poverty line in Cadastro Único after Bolsa Família (%)
4	1	People earning up to 1/4 of the minimum wage (%)
5	2	Childhood obesity (%)
6	2	Low birth weight (%)
7	2	Childhood malnutrition (%)
8	2	Family agriculture producers supported by PRONAF (%)
9	2	Establishments practicing organic agriculture (%)
10	3	Vaccination coverage (%)
11	3	Suicide mortality (per 100,000 inhabitants)
12	3	Infant mortality (children under one year) (per 1,000 live births)
13	3	Maternal mortality (per 1,000 live births)
14	3	Childhood mortality (per 1,000 live births)
15	3	Neonatal mortality (children aged 0 to 27 days) (per 1,000 live births)

(Table 1 to be continued)

[1] CO_2e Emissions per Capita Index – Source: Greenhouse Gas Emissions and Removals Estimates System (SEEG Municípios) and Percentage of Deforested Municipalities Index – Source: MapBiomas, both initiatives by the non-governmental organization Observatório do Clima, in collaboration with a network involving other institutions.

(Table 1 continued)

16	3	Mortality from AIDS (per 100,000 inhabitants)
17	3	Incidence of dengue (per 100,000 inhabitants)
18	3	Premature mortality from chronic non-communicable diseases (per 100,000 inhabitants)
19	3	Municipal budget for health (R$ per capita)
20	3	Population served by family health teams (%)
21	3	Detection of hepatitis ABC (per 100,000 inhabitants)
22	3	Inadequate prenatal care (%)
23	3	Basic Health Units (per 1,000 inhabitants)
24	3	Life expectancy at birth (Years)
25	3	Adolescent pregnancy (%)
26	3	Incidence of tuberculosis (per 100,000 inhabitants)
27	4	Internet access in public elementary and secondary schools (%)
28	4	Schools with adequate facilities for people with disabilities (%)
29	4	Schools with resources for Specialized Educational Care (%)
30	4	Basic Education Development Index (IDEB) - final years (IN)
31	4	Basic Education Development Index (IDEB) - early years (IN)
32	4	Youth with completed high school education by age 19 (%)
33	4	Teachers with higher education - Early Childhood - public network (%)
34	4	Teachers with higher education - Elementary School - public network (%)
35	4	Prova Brasil - Portuguese Language - Final Years of Elementary School - municipal network (IN)
36	4	Prova Brasil - Portuguese Language - Early Years of Elementary School - municipal network (IN)
37	4	Prova Brasil - Mathematics - Final Years of Elementary School - municipal network (IN)
38	4	Prova Brasil - Mathematics - Early Years of Elementary School - municipal network (IN)
39	4	The ratio between the number of students and teachers in preschool (Rate)
40	4	The ratio between the number of students and teachers in elementary school (Rate)
41	4	Rate of grade distortion in Elementary School - public network (Rate)
42	4	Illiteracy in the population aged 15 and older (%)
43	4	Cultural centers, houses, and cultural spaces (per 100,000 inhabitants)
44	4	Children and youth aged 4 to 17 in school (%)
45	5	Young women aged 15 to 24 not in school or work (%)
46	5	Presence of female councilors in City Council (%)
47	5	Gender pay gap (Ratio)
48	5	Percentage point difference between young women and men not in school or work (%)
49	5	Femicide rate (per 100,000 women)
50	6	Diseases related to inadequate environmental sanitation (per 100,000 inhabitants)
51	6	Loss of treated water in distribution (%)
52	6	Total population served with water supply (%)
53	6	Population served with sanitation (%)
54	6	Sewage treatment index (%)
55	7	Households with access to electricity (%)
56	7	Energy Vulnerability Index
57	8	Population employed between 10 and 17 years (%)

(Table 1 to be continued)

(Table 1 continued)

58	8	GDP per capita (R$ per capita)
59	8	Unemployment rate (%)
60	8	Youth unemployment rate (%)
61	8	Youth aged 15 to 24 not in school or work (%)
62	8	Employment rate for people aged 16 and older (%)
63	9	Public investment in urban infrastructure per inhabitant (R$ per capita)
64	9	Share of formal jobs in knowledge and technology-intensive activities (%)
65	10	Municipal income appropriated by the poorest 20% (%)
66	10	Gini coefficient (IN)
67	10	Infant mortality ratio (Ratio)
68	10	Adolescent pregnancy ratio (Ratio)
69	10	Rate of grade distortion in the early years of Elementary School (Ratio)
70	10	The relative risk of homicides (Ratio)
71	10	Violence against LGBTQI+ population (per 100,000 inhabitants)
72	10	Access to primary health care facilities (%)
73	10	Real average income ratio (Ratio (R$))
74	10	Rate of grade distortion in the final years of Elementary School (Ratio)
75	11	Percentage of low-income population with a commuting time to work > 1 hour (%)
76	11	Traffic deaths (per 100,000 inhabitants)
77	11	Population residing in slum areas (%)
78	11	Households in favelas (%)
79	11	Sports facilities (per 100,000 inhabitants)
80	11	Percentage of black population in slum settlements (%)
81	12	Household solid waste collected per capita (kg/day/person)
82	12	Recovery of selectively collected urban solid waste (%)
83	12	Population served with selective waste collection (%)
84	13	CO_2e emissions per capita (tons of CO_2e per capita)
85	13	Concentration of heat spots (per thousand)
86	13	Proportion of strategies for risk management and disaster prevention (%)
87	13	Percentage of deforested municipalities (%)
88	14	Sewage treated before reaching the sea, rivers, and streams (%)
89	15	Forested and natural areas rate (HA/HAB)
90	15	Integral protection and sustainable use conservation units (%)
91	15	Maturity level of environmental protection financing instruments (%)
92	16	Youth homicide rate (per 100,000 inhabitants)
93	16	Deaths by assault (per 100,000 inhabitants)
94	16	Deaths by firearm (per 100,000 inhabitants)
95	16	Homicide rate (per 100,000 inhabitants)
96	16	Maturity level of internal control and anti-corruption policies (%)
97	16	Maturity level of human rights promotion and participation policies (%)
98	16	Maturity level of transparency policies (%)
99	17	Public investment (R$ per capita)
100	17	Total municipal revenues collected (%)

Source: Author's elaboration based on IDSC-BR data (2023).

For an indicator to be selected, it must meet several criteria: the necessary data should be recent and updated to allow for continuous monitoring (typically between 2010 and 2020), available at the national level; it must have statistical validity; at least 80% of the analyzed municipalities must meet the required coverage; it should be easy to interpret; it should have implications for public policies; and it must be normative, avoiding qualitative indicators as the goal is to track results, not means. After meeting these conditions, the data must undergo statistical treatment to construct the index (Figure 2).

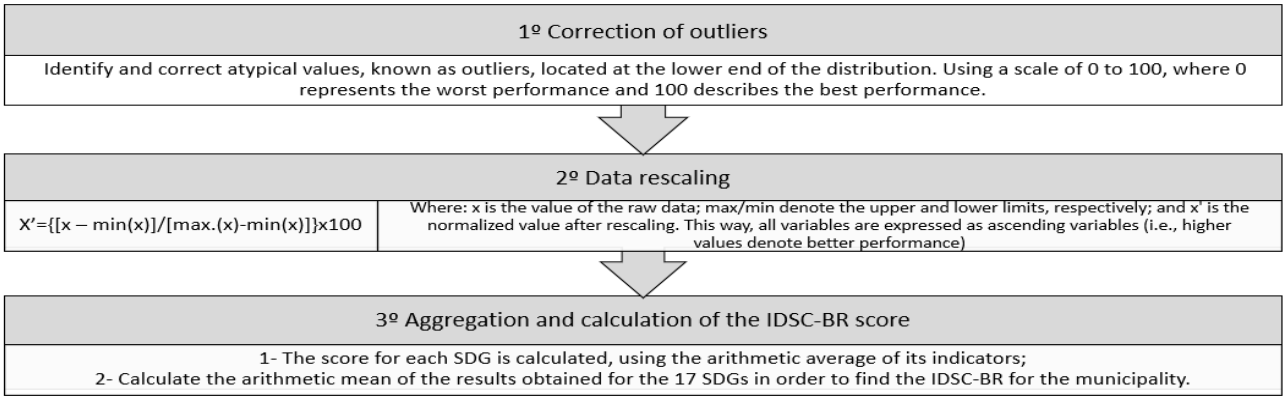


Figure 2 IDSC-BR Construction Method

The IDSC-BR score reflects the percentage of optimal performance. Therefore, the difference between the obtained score and 100 corresponds to the percentage points a city needs to improve to reach optimal performance. In this context, minor differences in scores may result in differences in the final ranking of cities.

The index includes the ODS Panels, which provide a graphical representation of municipalities' performance, i.e., the level of development, concerning the 17 Sustainable Development Goals (SDGs). Using a color-coding system (green, yellow, orange, and red), the Panels indicate how close a municipality is to achieving each goal. The closer to red, the greater the distance toward not achieving the SDG.

The main gaps relate to the lack of data from official public sources and the reference year for some indicators. Both points highlight the need for investment in administrative and statistical systems to ensure the availability of critical data for monitoring the SDGs.

After addressing the main aspects of constructing the IDSC-BR, the next section of the article focuses on the methodology applied in the study.

3. Methodology

The sample encompasses the 26 Brazilian capitals distributed across five regions, aiming to cover the entire national territory. Data collection relied on information on the Sustainable Development Index of Cities - Brazil website for 2023, developed by SDSN. This information includes scores, utilized indicators, achieved SDGs, characteristics of each capital, rankings, and other relevant data.

The data collected in December 2023 were compiled and processed into a specific spreadsheet for analysis, focusing on interpreting the available results. This analysis used a quantitative approach through descriptive statistics and a qualitative perspective to understand the nuances and implications related to the performance of capitals across various dimensions addressed by the index.

The analysis of the IDSC-BR, beyond considering the overall percentage score, also evaluated the individual

scores of each of the 17 SDGs. We used Five color-coded intervals to assess the progress of municipalities in each indicator, the average indicators of each SDG, and the overall average resulting from the index itself. In cases where data were unavailable, we used color gray. Additionally, we implemented a system of arrows to track the evolution of capitals over time toward the 2030 Agenda through the IDSC-BR dashboard, following the SDSN methodology for the global SDG Index (Table 2).

Table 2 Levels and Evolution Regarding Sustainable Development

Classification	Level of Development	Range (points)
Dark Green	Very High	80 a 100
Green	High	60 a 79,99
Yellow	Medium	50 a 59,99
Orange	Low	40 a 49,99
Red	Very Low	0 a 39,99
Gray	Unavailable Information	-
Symbol	**Evolution**	
↑	Positive Variance	
→	Stagnant	
↓	Negative Variance	

This methodology aims to provide a comprehensive understanding of the landscape of Brazilian capitals concerning the IDSC-BR of 2023, highlighting relevant aspects and contributing to a critical analysis of the presented scenario.

4. Results and Data Analysis

Table 3 provides a comprehensive view of the descriptive statistics related to the Sustainable Development Index of Cities – Brazil, disaggregated by region. The averages indicate that the North and Northeast states generally show lower percentages regarding achieving the Sustainable Development Goals (SDGs).

Table 3 Descriptive Statistics of IDSC-BR Capitals by Region

	(1)	(2)	(3)	(4)	(5)
Region	n	Mean	Std. Dev.	Min	Max
North	7	43,24	4,857	37,33	52,36
North East	9	46,59	2,974	43,75	51,29
Midwest	3	53,46	3,093	49,22	56,50
Southeast	4	55,27	2,039	52,67	58,32
South	3	54,76	2,262	51,56	56,46

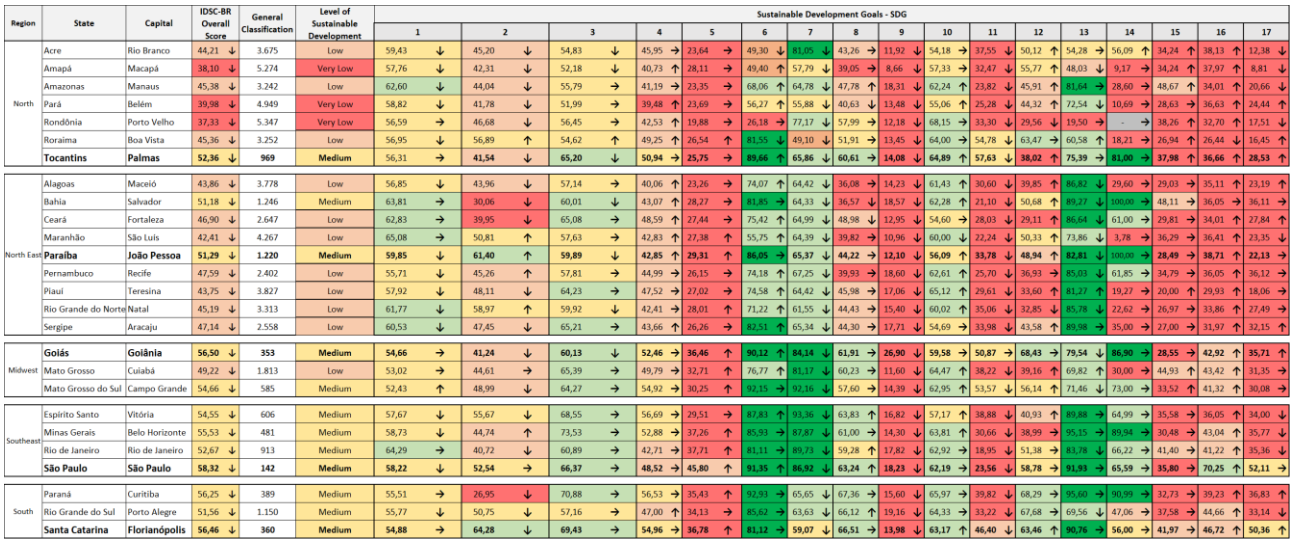
Source: Author's elaboration based on data from IDSC-BR (2023).

The analysis of the variation between the indices reveals that the North region has the most significant disparity, indicating a more pronounced deficiency in achieving the SDGs than other regions. The lowest average in the North region corroborates this.

On the other hand, the Southeast region stands out for having the smallest variation between the indices of its capitals, indicating consistency in results. Despite being the region with the best results, followed by the South,

Central-West, and Northeast regions, it is essential to note that these results still need to be closer to the targets set by the 2030 Agenda.

Figure 3 presents a compilation of the information related to the IDSC-BR and its construction based on the score obtained for each SDG. The analysis reveals that no capital reached a high overall level of sustainable development in the IDSC-BR for 2023, showing a negative variation in their overall indices compared to 2022. These results align with the findings of Sachs et al. (2023) regarding the global SDG Index.



Region	State	Capital	IDSC-BR Overall Score	General Classification	Level of Sustainable Development	Sustainable Development Goals - SDG														
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
North	Acre	Rio Branco	44,21 ↓	3.675	Low	59,43 ↓	45,20 ↓	54,83 ↓	45,95 →	23,64 →	49,30 ↓	81,05 ↓	43,26 →	11,92 ↓	54,18 →	37,55 ↓	50,12 ↑	54,28 →	56,09 ↑	34,24 ↑	38,13 ↑	12,38 ↓
	Amapá	Macapá	38,10 ↓	5.274	Very Low	57,76 ↓	42,31 ↓	52,18 ↓	40,73 ↑	28,11 →	49,40 ↑	57,79 ↓	39,05 →	8,66 ↓	57,33 →	32,47 ↓	55,77 ↑	48,03 ↓	9,17 →	34,24 ↑	37,97 ↑	8,81 ↓
	Amazonas	Manaus	45,38 ↓	3.242	Low	62,60 ↓	44,04 ↓	55,79 →	41,19 →	23,35 →	68,06 ↑	64,78 ↓	47,78 ↑	18,31 ↓	62,24 ↑	23,82 ↓	45,91 ↑	81,64 →	28,60 →	48,67 ↑	34,01 ↑	20,66 ↓
	Pará	Belém	39,98 ↓	4.949	Very Low	58,82 ↓	41,78 ↓	51,99 →	39,48 ↑	23,69 →	56,27 ↑	55,88 ↓	40,63 ↓	13,48 ↓	55,06 ↑	25,28 ↓	44,32 ↑	72,54 ↓	10,69 →	28,63 →	36,63 ↑	24,44 ↑
	Rondônia	Porto Velho	37,33 ↓	5.347	Very Low	56,59 →	46,68 ↓	56,45 →	42,53 ↑	19,88 →	26,18 →	77,17 ↓	57,99 →	12,18 ↓	68,15 →	33,30 ↓	29,56 ↓	19,50 →	- →	38,26 ↑	32,70 ↑	17,51 ↓
	Roraima	Boa Vista	45,36 ↓	3.252	Low	56,95 ↓	56,89 ↑	54,62 ↑	49,25 ↑	26,54 ↑	81,55 ↓	49,10 ↓	51,91 →	13,45 ↓	64,00 →	54,78 ↓	63,47 →	60,58 ↑	18,21 →	26,94 ↑	26,44 ↓	16,45 ↑
	Tocantins	**Palmas**	**52,36 ↓**	**969**	**Medium**	56,31 →	**41,54 ↓**	**65,20 ↓**	**50,94 →**	**25,75 →**	**89,66 ↑**	**65,86 ↓**	**60,61 →**	**14,08 ↓**	**64,89 ↑**	**57,63 ↓**	**38,02 ↑**	**75,39 →**	**81,00 →**	**37,98 ↑**	**36,66 ↑**	**28,53 ↑**
North East	Alagoas	Maceió	43,86 ↓	3.778	Low	56,85 ↓	43,96 ↓	57,14 →	40,06 ↑	23,26 →	74,07 ↑	64,42 ↓	36,08 →	14,23 ↓	61,43 ↑	30,60 ↓	39,85 ↑	86,82 ↓	29,60 →	29,03 →	35,11 ↑	23,19 ↑
	Bahia	Salvador	51,18 ↓	1.246	Medium	63,81 →	30,06 ↓	60,01 ↓	43,07 ↑	28,27 →	81,85 →	64,33 ↓	36,57 ↓	18,57 ↓	62,28 ↑	21,10 ↓	50,68 ↑	89,27 ↓	100,00 →	48,11 →	36,05 →	36,11 →
	Ceará	Fortaleza	46,90 ↓	2.647	Low	62,83 →	39,95 ↓	65,08 →	48,59 ↑	27,44 →	75,42 ↑	64,99 ↓	48,98 ↓	12,95 ↓	54,60 →	28,03 ↓	29,11 ↑	86,64 ↓	61,00 →	29,81 →	34,01 ↑	27,84 ↑
	Maranhão	São Luís	42,41 ↓	4.267	Low	65,08 →	50,81 ↑	57,63 →	42,83 ↑	27,38 ↑	55,75 ↑	64,39 ↓	39,82 →	10,96 ↓	60,00 ↓	22,24 ↓	50,33 ↑	73,86 ↓	3,78 →	36,29 →	36,41 ↑	23,35 ↓
	Paraíba	**João Pessoa**	**51,29 ↓**	**1.220**	**Medium**	**59,85 ↓**	**61,40 ↑**	**59,89 ↓**	**42,85 ↑**	**29,31 ↑**	**86,05 →**	**65,37 ↓**	**44,22 →**	**12,10 ↓**	**56,09 ↑**	**33,78 ↓**	**48,94 ↑**	**82,81 ↓**	100,00 →	**28,49 →**	**38,71 ↑**	**22,13 →**
	Pernambuco	Recife	47,59 ↓	2.402	Low	55,71 ↓	45,26 ↑	57,81 →	44,99 →	26,15 →	74,18 ↑	67,25 ↓	39,93 →	18,60 ↓	62,61 ↑	25,70 ↓	36,93 →	85,03 ↓	61,85 →	34,79 →	36,05 ↑	36,12 →
	Piauí	Teresina	43,75 ↓	3.827	Low	57,92 ↓	48,11 ↓	64,23 →	47,52 →	27,02 →	74,58 ↑	64,42 ↓	45,98 →	17,06 ↓	65,12 ↑	29,61 ↓	33,60 ↑	81,27 ↓	19,27 →	20,00 →	29,93 ↑	18,06 →
	Rio Grande do Norte	Natal	45,19 ↓	3.313	Low	61,77 ↓	58,97 ↑	59,92 ↓	42,41 →	28,01 ↑	71,22 ↑	61,55 ↓	44,43 →	15,40 ↓	60,02 ↑	35,06 ↓	32,85 ↓	85,78 ↓	22,62 →	26,97 →	33,86 ↑	27,49 →
	Sergipe	Aracaju	47,14 ↓	2.558	Low	60,53 ↓	47,45 ↓	65,21 →	43,66 ↑	26,26 →	82,51 ↑	65,34 ↓	44,30 →	17,71 ↓	54,69 →	33,98 ↓	43,58 ↑	89,98 →	35,00 →	27,00 →	31,97 ↑	32,15 ↑
Midwest	**Goiás**	**Goiânia**	**56,50 ↓**	**353**	**Medium**	**54,66 →**	**41,24 ↓**	**60,13 ↓**	**52,46 →**	**36,46 ↑**	**90,12 ↑**	**84,14 ↓**	**61,91 →**	**26,90 ↓**	**59,58 →**	**50,87 →**	**68,43 →**	**79,54 ↓**	**86,90 →**	**28,55 →**	**42,92 ↑**	**35,71 ↑**
	Mato Grosso	Cuiabá	49,22 ↓	1.813	Low	53,02 →	44,61 →	65,39 →	49,79 →	32,71 ↑	76,77 ↑	81,17 ↓	60,23 →	11,60 ↓	64,47 ↑	38,22 ↓	39,16 ↑	69,82 ↑	30,00 →	44,93 ↑	43,42 ↑	31,35 →
	Mato Grosso do Sul	Campo Grande	54,66 ↓	585	Medium	52,43 ↑	48,99 ↓	64,27 →	54,92 →	30,25 ↑	92,15 →	92,16 ↓	57,60 →	14,39 ↓	62,95 ↑	53,57 ↓	56,14 ↑	71,46 ↓	73,00 →	33,52 ↑	41,32 ↑	30,08 →
Southeast	Espírito Santo	Vitória	54,55 ↓	606	Medium	57,67 ↓	55,67 ↓	68,55 →	56,69 →	29,51 →	87,83 ↑	93,36 ↓	63,83 ↑	16,82 ↓	57,17 ↑	38,88 ↓	40,93 ↑	89,88 →	64,99 →	35,58 →	36,05 ↑	34,00 ↓
	Minas Gerais	Belo Horizonte	55,53 ↓	481	Medium	58,73 ↓	44,74 ↑	73,53 →	52,88 →	37,26 ↑	85,93 →	87,87 ↓	61,00 →	14,30 ↓	63,81 ↑	30,66 ↓	38,99 →	95,15 →	89,94 →	30,48 →	43,04 ↑	35,77 ↓
	Rio de Janeiro	Rio de Janeiro	52,67 ↓	913	Medium	64,29 →	40,72 ↓	60,89 →	42,71 →	37,71 ↑	81,11 →	89,73 ↓	59,28 ↑	17,82 ↓	62,92 →	18,95 ↓	51,38 →	83,78 ↓	66,22 →	41,40 →	41,22 ↑	35,36 ↓
	São Paulo	**São Paulo**	**58,32 ↓**	**142**	**Medium**	**58,22 ↓**	**52,54 →**	**66,37 →**	**48,52 →**	**45,80 ↑**	**91,35 ↑**	**86,92 ↓**	**63,24 ↑**	**18,23 ↓**	**62,19 →**	**23,56 ↓**	**58,78 →**	**91,93 →**	**65,59 →**	**35,80 →**	**70,25 ↑**	**52,11 →**
South	Paraná	Curitiba	56,25 ↓	389	Medium	55,51 →	26,95 ↓	70,88 →	56,53 →	35,43 ↑	92,93 →	65,65 ↓	67,36 →	15,60 ↓	65,97 →	39,82 ↓	68,29 →	95,60 →	90,99 →	32,73 →	39,23 ↑	36,83 ↑
	Rio Grande do Sul	Porto Alegre	51,56 ↓	1.150	Medium	55,77 ↓	50,75 ↓	57,16 →	47,00 ↑	34,13 →	85,62 →	63,63 ↓	66,12 ↑	19,16 ↓	64,33 →	33,22 ↓	67,68 →	69,56 ↓	47,06 →	37,58 →	44,66 ↑	33,14 ↓
	Santa Catarina	**Florianópolis**	**56,46 ↓**	**360**	**Medium**	**54,88 →**	**64,28 ↓**	**69,43 →**	**54,96 →**	**36,78 ↑**	**81,12 →**	**59,07 ↓**	**66,51 →**	**13,98 ↓**	**63,17 ↑**	**46,40 ↓**	**63,46 ↑**	**90,76 →**	**56,00 →**	**41,97 →**	**46,72 ↑**	**50,36 ↑**

Figure 3 Sustainable Cities Development Index – Brazil (IDSC-BR) of Brazilian Capitals

Source: Author's elaboration based on data from IDSC-BR (2023). **Notes**: Level of Sustainable Development: Dark Green = Very high (80 to 100); Green = High (60 to 79.99); Yellow = Medium (50 to 59.99); Orange = Low (40 to 49.99); Red = Very low (0 to 39.99); and Gray = Unavailable Information. Evolution of the IDSC-BR Score: ↑ = positive variation; → = Stagnated; and ↓ = negative variation.

We observed that the North region has the worst results among the regions, being the only one with capitals evaluated at a deficient level of development (Rio Branco, Belém, and Porto Velho). Among the results, Palmas stands out as the only capital in the North region with an IDSC-BR above 50%. On the other hand, Porto Velho holds the worst classification among the capitals, with an IDSC-BR of 37.33. Additionally, it has the highest number of SDGs rated as very low (approximately 53%), and it does not include the score for SDG 14.

In the Northeast region, we noted 78% of the capitals with a low level of development, with the exceptions being Salvador and João Pessoa, whose indices are 51.18% and 51.29%, respectively. In the Central-West region, the Cuiabá rate has a low IDSC-BR. At the same time, Goiânia and Campo Grande have a medium level of development, with only 4 SDGs rated as very low and 2 SDGs rated as low.

The Southeast region has the best individual results, being the only region where all capitals are among the top 1,000 cities rated by the IDSC-BR. São Paulo, with an IDSC-BR of 58.32%, is the closest capital to achieving a high level of sustainability, defined as above 60%, and is the only one with only 5 SDGs rated as very low or low. Finally, the South region is very close to the Southeast regarding IDSC-BR and its variations between minimum and maximum indices.

Returning to the analysis of the IDSC-BR (Figure 3), Tables 7 and 8 have been prepared to provide better support for readers. Next, the evolution of the SDGs that make up the IDSC-BR, detailed in Figure 5, will be examined. The SDGs 3, 6, 7, 10, and 13 were the only ones to achieve a high level of development (Table 4).

Table 4 Descriptive Statistics — SDG With High Medium Level of Development

SDG	Description	(1) Mean	(2) Std. Dev.	(3) Min	(4) Max
3	Good Health and Well-Being	61,33	3,351	51,99	69,43
6	Clean Water And Sanitation	75,42	15,872	26,18	91,35
7	Affordable and Clean Energy	70,67	12,089	49,10	93,36
10	Reduce Inequalities	61,13	3,853	54,18	68,15
13	Climate Action	77,34	16,557	19,50	95,15

Interestingly, the indicators with the highest average also have the largest standard deviation, meaning there are significant differences between the minimum and maximum values, highlighting the disparities among capitals.

Regarding SDG 6, Porto Velho had the lowest score at 26.18%. Rio Branco and Macapá also had low performance, while Belém had an average performance. In total, 84.6% of the capitals achieved high or very high performance related to “Clean Water and Sanitation”.

Although it is among the best-performing SDGs, SDG 7 showed a decrease in all capitals compared to the previous year. Conversely, SDG 10 displays the smallest variation between the minimum and maximum indicators and, along with SDGs 4, 5, 14, and 15, did not experience negative variation in any capital. SDG 13, on the other hand, has the highest average score, with 15 capitals reaching a very high level of development.

Directing the analysis towards the SDGs with the worst performance (Table 5), we identify 6 SDGs. It is noticeable that, although the differences between the minimum and maximum values are still significant, they are smaller compared to those of the best-performing SDGs.

Table 5 Descriptive Statistics — SDG with Very Low Average Level of Development

SDG	Description	(1) Mean	(2) Std. Dev.	(3) Min	(4) Max
5	Gender Equality	29,62	5,766	19,88	45,80
9	Industry, Innovation and Infrastructure	15,33	3,578	8,66	26,90
11	Sustainable Cities and Communities	34,58	10,492	18,95	57,63
15	Life on Land	34,31	6,787	20,00	48,67
16	Peace, Justice, and Strong Institutions	38,60	7,825	26,44	70,25
17	Partnerships for the Goals	28,84	10,081	8,81	52,11

Despite the low scores, as mentioned earlier, SDGs 5 and 15 have remained stable or improved. Conversely, SDG 9 had the lowest average result among all SDGs and, along with SDG 11, experienced negative variation in all capitals. The second lowest result is SDG 17, which, although close to the results obtained for SDG 5, shows a more significant variation between its minimum and maximum values, experiencing negative variation in 23% of the capitals.

SDG 16 presents an attractive characteristic: except for São Paulo, which achieved a high score of 70.25%, all other capitals were classified as very low (18 capitals) or low (7 capitals) in performance. However, excluding Boa Vista, which experienced a negative variation, the index either improved or remained stable in the other capitals.

The values found for SDG 17, “Partnerships for the Goals”, are notable for their low results. They align with

OECD (2017) recommendations regarding developing new forms of cooperation that facilitate stakeholder relationships. This highlights the challenge of ensuring effective governance and coordination structures between agencies and levels of government, as emphasized by OECD (2017).

This analysis will guide the transition to the final considerations by reflecting on the need for specific strategies for each SDG and emphasizing the importance of regional approaches tailored to the diverse realities of all Brazilian capitals. Highlighting paths to advance towards more equitable sustainable development aligned with the principles of the 2030 Agenda, this approach is consistent with the recommendations of OECD (2017) and studies by Kemp and Martens (2007), Koch and Krellenberg (2018), Cruz et al. (2022), and Albuquerque de Melo et al. (2023).

5. Conclusion

The research aimed to examine the Sustainable Development Index of Cities - Brazil (IDSC-BR) concerning the achievement of the SDGs in the 26 Brazilian capitals. The purpose was to understand the current situation of these cities regarding SDG compliance, both in comparison with other capitals in their regions and on a national scale.

The results obtained show that we still have much work ahead. Despite its weaknesses, such as the lack of outdated data sources, the IDSC-BR is an essential analytical tool for the 2030 Agenda. It provides a clear view of the local reality, contributing valuably to formulating targeted public policies.

Formulating specific public policies that account for significant differences between cities and regions is especially relevant in a country of continental dimensions. This approach aligns with recommendations from previous studies, emphasizing the need to identify, study, and, where applicable, replicate successful policies from one city or region while continuously seeking alternatives that match the local reality.

The capitals in the North region face the most significant challenges, with the lowest combined scores and the only three capitals rated with a shallow development index, requiring targeted actions. Given the significance of the Amazon Rainforest, indicators such as SDG 13 – Climate Action, SDG 14 – Life Below Water, and SDG 15 – Life on Land should receive special attention for this region.

As mentioned, significant updates are expected in the IDSC-BR for 2024, given that the 2023 version relied on data from the 2010 IBGE Census, and more recent data will soon be available. Additionally, the anticipated completion of an updated version of the Voluntary National Review (VNR), to be presented at the UN High-Level Political Forum in 2024, should broaden the scope of analysis.

The research has some limitations because the results apply only to capital cities and only extend to some Brazilian cities. Moreover, the analysis was based solely on 2023 data, representing the most recent information available for the IDSC-BR. Therefore, we recommended that future research employ panel data to examine possible determinants explaining city ranking variations.

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