

Inteli.Gente Platform

**Key performance indicators for Brazilian Smart Sustainable
Cities**

U4SSC for Global Southern Countries

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CONTEXT



Inteli.gente Platform: Initiative coordinated by **MCTI, MDR e Mcom Brazil** that advocates for public policy to encourage the use of ICTs to ease the transition to smart sustainable cities.

Inteli.Gente Platform: contributes to the achievement of the **Sustainable Development Goal 11:** "Make cities and human settlements inclusive, safe, resilient and sustainable.

Brazilian Charter SC Goal 8, 8.3: "Developing and making available a Brazilian maturity system for smart cities on a digital platform of its own to be created and maintained by the federal government".

CONTEXT



The Platform Inteli.Gente Initiative has developed a set of national and international **key performance indicators (KPIs) for Smart sustainable cities (SSC)** to establish the criteria to evaluate ICT's contributions in making cities smarter and more sustainable, and to provide cities with the means for self-assessments.

Opportunities for Public Governance

- **Support cities** in the implementation and use of SSC KPIs with analysis and recommendations;
- Test and verify the applicability of SSC-KPIs in **all cities in Brazil**;
- To create a **customized maturity data** for each of the 5,570 Brazilian cities;

KPIS PRINCIPLES

- **Comprehensiveness:** The set of indicators should cover all the aspects of SSC.
- **Availability:** The KPIs should be the historic and current data should either be available or easy to collect.
- **Accuracy:** Precision of data and information, define the proximity of an experimental result, with its real value
- **Timeliness:** This refers to the ability to produce KPIs with respect to emerging issues in Brazilian SSC construction.

GOALS

To be a maturity model with sustainable development indicators and Institutional Capabilities for Public Management contextualized;

Allow diagnostics to be performed; propose guidelines and policy axes, through inputs for the elaboration and formulation of national and municipal policies for Brazilian Sustainable Smart Cities;

Contribute with federal, state and municipal public managers, in identifying the current conditions of cities, skills and needs to advance towards making Brazilian cities sustainable smart, in the medium and long term.

* Therefore, there is no generation of a ranking of cities.

MATURITY LEVELS

Two new maturity levels were created to meet and understand the diversity of Brazilian cities



- 1. Access:** The city is in the initial process of adopting the concept of a sustainable smart city and has not defined its own trajectory of digital transformation. It presents the lowest results for the indicators, which expresses the need for improvement in economic, environmental and sociocultural aspects.
- 2 Commitment:** The city makes an initial commitment to its own trajectory towards becoming a sustainable smart city. Indicators point to a slight improvement, but infrastructural lags persist, negatively affecting the provision of services to people.

INTELI.GENTE FRAMEWORK

73 Urban Development and TICs Indicators
7 Characterization

Dimension

Economy

- ICT Infrastructure
- Water and Sewage
- Innovation
- Solid Waste
- Transport
- Innovation
- Housing
- Urbanization of public roads
- Systems and Technology for Public Management

Environment

- Water and Sewage
- Solid Waste
- Air Quality
- Green Areas
- Energy

Social and Culture

- Education
- Health
- Culture
- Digital Inclusion
- Social Inclusion
- Public Safety
- Disaster Management
- Public Participation

Characterization

- Public Finance
- Urban Arrangement
- Job
- Rent inequality -GINI
- Human development Index - IDH
- Gross Domestic Product- PIB
- Population Size

Topics/
Components

INTELI.GENTE FRAMEWORK

34 Indicators

Dimension

Institucional Capability

Axes
Components

Strategy

- Planning
- Collaborative Governance
- Technological Governance
- Follow-up of municipal public policies
- City vision and concept

Infrastructure

- Urban and IT infrastructure planning
- Scope and Quality
- Institutionalization of IT management
- HD-SW Infrastructure
- IT Governance

Data

- Planning data usage and security
- Scanning of databases
- Open data and transparency
- Integration and interoperability of databases

Monitoring

- Monitoring and evaluation planning
- Coordination of monitoring actions
- Quality perception
- Monitoring transparency

Applications and
Services

- Planning for services and applications
- Integration and Interoperability
- Online public services
- Inclusion and digital literacy
- Urban services

Detail	MM-SSC ITU	Brazilian Model
Multidimensionality	3 dimensions: Economic, Environment and Sociocultural	04 dimensions: Economic, Sociocultural, Environment and Institutional Capability of Municipal Public Management. In the dimensions of sustainable development, a set of 07 indicators was determined for the recognition of the municipalities called Characterization .
Level	05 Levels - 1. Planning, 2. Alignment, 3. Development, 4. Integration and 5. Optimization	07 Levels- 1. Adhesion, 2. Engagement, 3. Planning, 4. Alignment, 5. Development, 6. Integration and 7. Optimization
Indicators (Types)	Core Indicators: These are indicators to be considered by all cities when carrying out the maturity assessment . It is recommended that target values are achieved for all core indicators listed at a given level for cities to confirm that they have reached that level.	They are indicators of sustainable development and ICTs, relevant to offer essential information and to discriminate the technological evolution of urban and ICT infrastructures for a smart city . They follow the evolution of the city's performance and reflect the changes in the conditions of the Economic, Sociocultural and Environment dimensions of the model. Still, they follow an evolutionary logic to boost diagnostics on urban infrastructures and advances in ICT.
	Additional indicators These are indicators that can be considered by cities when developing their own maturity assessment plan and when carrying out the maturity assessment	They are indicators for sustainable development and ICTs, with attributes in technology and innovation that guide public actions and policies in the city . They are indicators that complement the information of the indicators named as Core in a given topic and still address needs in services and applications with the use of ICT.

Detail	MM-SSC ITU	Brazilian Model
Indicators (Weights)	<p>Weights: Can be used to reflect their degree of importance in the digital transformation of city sectors, as well as to define the weight of each indicator determined through its contribution to all aspects and key areas of public management</p>	<p>High Relevance: These are indicators that are directly linked to the thematic areas of public policy, applied to topics in each dimension of sustainable development and ITcs. They inform about the adequacy of the city's urban and ICT infrastructure. When used in metrification, the weight assigned to the indicator will be three.</p> <p>Average Relevance: These are indicators of intermediate relevance, which allow the diagnosis of the evolution of ICT solutions and the improvement of the urban infrastructure available in the city. When used in metrification, the weight assigned to the indicator will be two.</p> <p>.Low relevance: They are considered indicators of less relevance and in diagnosis they privilege the sustainable digital transformation and the provision and offer of services, solutions and integrated applications in the city. When used in metrification the weight assigned to the indicator will be one.</p>

Final Grip

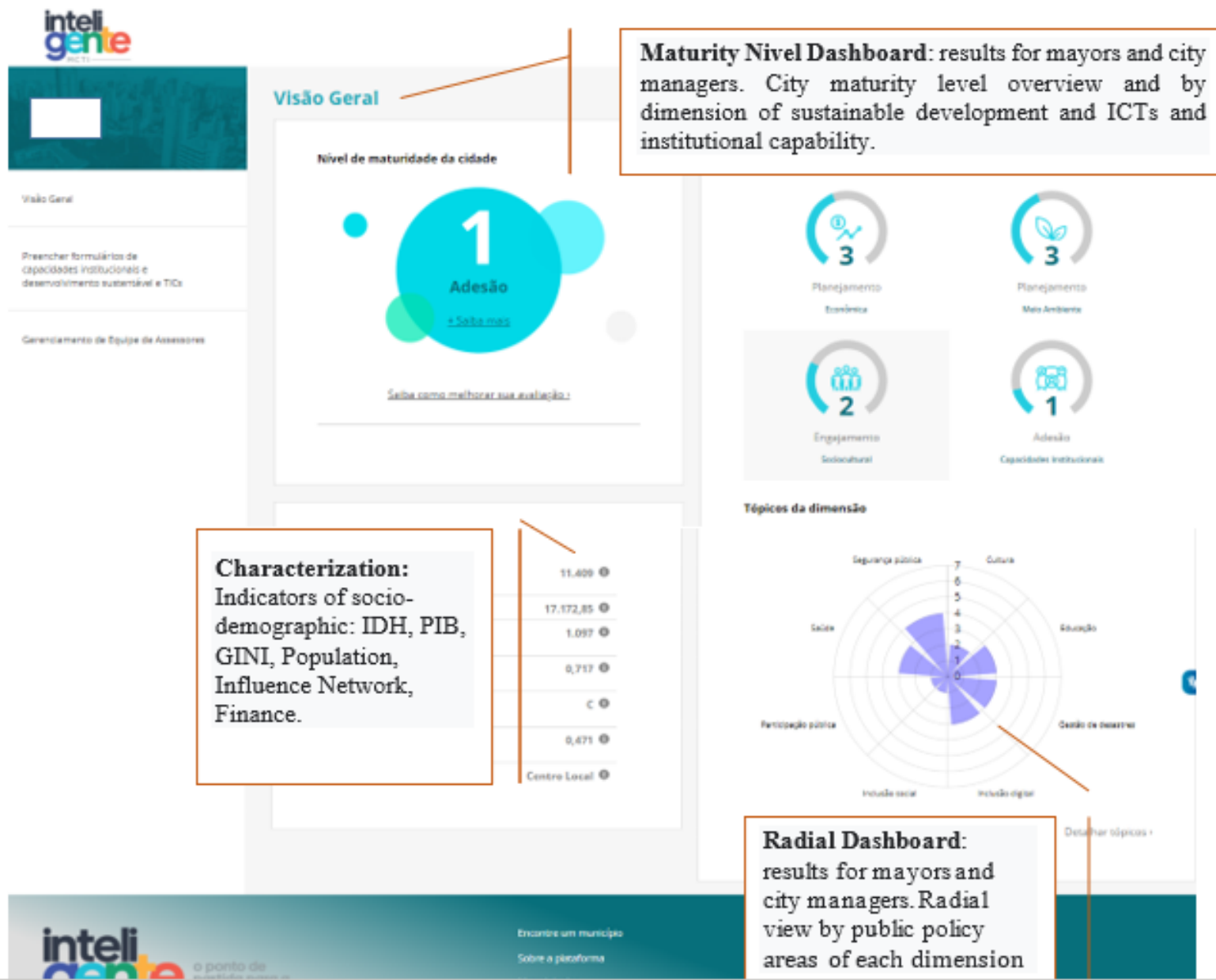
The platform-maintained adherence with:

.60% of the core indicators by the **MM-SSC ITU**;

.40% with the recommendations of **ISO
37120/37122/37123**

.100% to the objective of **SDG and BCSC**

D a s h b o a r d



The slide features a dark blue background with a central black rectangle. The corners are decorated with light blue circuit-like patterns consisting of lines and circles. The main text is centered in the black rectangle.

Thank you!

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ADDITIONAL INFORMATION

Brazilian and
MM SSC ITU

adapted
Indicators

MM SSC ITU
Indicators

Brazilian
Indicators

ECONOMY

ICT and Basic Infrastructure – Core Indicators

Household Internet Access

Percentage of households with Internet access.

Dynamic Public Transport Information

Percentage of urban public transport stops for which traveller information is dynamically available to the public in real time

Traffic Monitoring

Percentage of major streets monitored by ICT.

Smart Water Meters

Percentage implementation of smart water meters.

Fixed Broadband Subscriptions

Percentage of households with fixed (wired) broadband.

Fiber Optic Coverage

Percentage of households with fiber optic broadband.

Base Station Numbers

Number of base station in the city

Smart Electricity Meters

Percentage implementation of smart electricity meters.

Wireless Broadband Subscriptions

Wireless broadband subscriptions per 100 000 inhabitants.

High Speed Fixed broadband Access

Percentage of households with high speed fixed access.

Monitoring solutions for public safety

Treated sewage volume index

Wireless Broadband Coverage

Percentage of the city served by wireless broadband (3G and 4G).

Precarious urban settlements

ECONOMY

ICT – Advanced Indicators

Availability of WIFI in Public Areas

Number of public WIFI hotspots in the city.

Intersection Control

Percentage of road intersections using adaptive traffic control or prioritization measures.

Demand Response Penetration

Percentage of electricity customers with demand response capabilities.

Open Data

Percentage and number of inventoried open datasets that are published.

Water Supply ICT Monitoring

Percentage of the water distribution system monitored by ICT.

City Hall Geographic Information System

Geographic Informations about de city

e- Government

Number of public services delivered through electronic means.

Drainage / Storm Water System ICT Monitoring

Percentage of drainage / storm water system monitored by ICT.

Command and Control Centers for City

Management (administration, management, security, transport)

Public Sector e-Procurement

Percentage of public sector procurement activities that are conducted electronically.

Electricity Supply ICT Monitoring

Percentage of electricity supply system monitored by ICT.

Smart City Integrated Platform (Integrated

Informations about de city)

ECONOMY

Productivity – Core Indicators

R&D Expenditure

Research and Development expenditure as a percentage of city GDP.

Unemployment Rate

Percentage of the total city labour force that is unemployed.

Professional qualification and labor intermediation

Urban Productive Inclusion

Patents

Number of new patents granted per 100 000 inhabitants per year.

Youth Unemployment Rate

Percentage of the city youth labour force that is unemployed.

Access to credit, microcredit and insurance

Generation of work and income in the municipality

Gross domestic product (PIB)

Productivity – Advanced Indicators

Small and Medium-Sized Enterprises

Percentage of small and medium-sized enterprises (SMEs).

Tourism Sector Employment

Percentage of the city labour force working in the tourism sector.

ICT Sector Employment

Percentage of the city labour force working in the ICT sector.

ECONOMY

Infrastructure – Core Indicators

Basic Water Supply

Percentage of households with access to basic water supply.

Electricity System Outage Frequency

Average number of electrical interruptions per customer per year.

Public Transport Network

Length of public transport network per 100 000 inhabitants.

Wastewater Collection

Percentage of households served by wastewater collection.

Potable Water Supply

Percentage of households with a safely managed drinking water service.

Electricity System Outage Time

Average length of electrical interruptions.

Bicycle Network

Length of bicycle paths and lanes per 100 000 population.

Household Sanitation

Percentage of households with access to basic sanitation facilities.

Water Supply Loss

Percentage of water loss in the water distribution system.

Access to Electricity

Percentage of households with authorized access to electricity.

Solid Waste Collection

Percentage of households with regular solid waste collection.

ECONOMY

Infrastructure – Advanced Indicators

Public Transport Network Convenience

Percentage of the city population that has convenient access (within 0.5 km) to public transport.

Shared Bicycles

Number of shared bicycles per 100 000 inhabitants.

Public Building Sustainability

Percentage area of public buildings with recognized sustainability certifications for ongoing operations.

Pedestrian Infrastructure

Percentage of the city designated as a pedestrian / car free zone.

Transportation Mode Share

Percentage of people using various forms of transportation to travel to work (public transportation, personal vehicles, bicycles, walking, paratransit)

Shared Vehicles

Number of shared vehicles per 100 000 inhabitants.

Integrated Building Management Systems in Public Buildings

Percentage area of public buildings using integrated ICT systems to automate building management

Urban Development and Spatial Planning

Existence of urban development and spatial planning strategies or documents at the city level

Travel Time Index

Ratio of the travel time during the peak periods to travel time at free flow periods.

Low-Carbon Emission Passenger Vehicles

Percentage of low-carbon emission passenger vehicles.

ENVIRONMENT

Environment – Core Indicators

Air Pollution

Air Quality Index based on reported value for: Particulate matter (PM2.5); NO2 (nitrogen dioxide); SO2 (sulphur dioxide); and, O3 (ozone).

Drinking Water Quality

Percentage of households covered by an audited Water Safety Plan.

Wastewater Treatment

Percentage of wastewater receiving treatment.

Green Areas

Green areas per 100 000 inhabitants.

GHG Emissions

Greenhouse gas (GHG) emissions per capita.

Water Consumption

Water consumption per capita.

Solid Waste Treatment

Percentage of solid waste.

EMF Exposure

Percentage of mobile network antenna sites in compliance with EMF exposure guidelines.

Freshwater Consumption

Freshwater consumption.

ENVIRONMENT

Environment – Advanced Indicators

Noise Exposure

Percentage of inhabitants exposed to excessive noise levels.

Green Area Accessibility

Percentage of inhabitants with accessibility to green areas.

Protected Natural Areas

Percentage of city area protected as natural sites.

Recreational Facilities

Area of total public recreational facilities per 100 000 inhabitants.

Protection of material and immaterial cultural heritage

ENVIRONMENT

Energy – Core Indicators

Renewable Energy Consumption

Percentage of renewable energy consumed in the city.

Electricity Consumption

Electricity consumption per capita.

Residential Thermal Energy Consumption

Residential thermal energy consumption per capita.

Public Building Energy Consumption

Energy consumption of public buildings.

Smart solutions for managing electricity consumption

Solutions for public lighting remote management

Society and Culture

Education, Health, Safety and Culture – Core Indicators

Student ICT Access

Percentage of students with classroom access to ICT facilities.

Life Expectancy

Average life expectancy.

Protection of material and immaterial cultural heritage

School Enrollment

Percentage of school-aged population enrolled in schools.

Maternal Mortality Rate

Maternal deaths per 100 000 live births.

IDEA

Higher Education Degrees

Higher level education degrees per 100 000 inhabitants.

Physicians

Number of physicians per 100 000 inhabitants.

Technological Education Center

Adult Literacy

Adult literacy rate.

Technology solutions for natural disaster management and monitoring

Education actions for specific communities

Society and Culture

Education, Health, Safety and Culture – Advanced Indicators

Percentage of municipal schools with internet access

Computers for student use.

Health Insurance/Public Health Coverage
Percentage of inhabitants covered by basic health insurance or a public health system.

Cultural Infrastructure
Number of the cultural institutions per 100 000 inhabitants.

In-Patient Hospital Beds
Number of in-patient public hospital beds per 100 000 inhabitants.

Telemedicine or telehealth services

Risk and health protection index for live births

Online health services offered to patients

Electronic Health Records
Percentage of city inhabitants with electronic health records.

Electronic Health Record

Online health services offered to patients

Monitoring solutions for public safety

Society and Culture

Safety, Housing and Social Inclusion – Core Indicators

Informal Settlements

Percentage of inhabitants living in slums, informal settlements or inadequate housing.

Gender Income Equity

Ratio of average hourly earnings of female to male workers.

Public policies and actions for public safety

Natural Disaster Related Deaths

Number of natural disaster related deaths per 100 000 inhabitants.

Police Service

Number of police officers per 100 000 inhabitants.

Gini Coefficient

Income distribution in accordance with Gini coefficient.

Poverty

Percentage of inhabitants living in poverty.

Disaster Related Economic Losses

Natural disaster related economic losses as a percentage of the city's GDP.

Fire Service

Number of firefighters per 100 000 inhabitants.

Voter Participation

Percentage of the eligible population that voted during the last municipal election.

Violent Crime Rate

Violent crime rate per 100 000 inhabitants.

Emergency Service Response Time Average response time for Emergency Services

Traffic Fatalities

Traffic fatalities per 100 000 inhabitants.

Society and Culture

Safety, Housing and Social Inclusion – Advanced Indicators

Housing Expenditure

Percentage expenditure of income for housing.

Resilience Plans

Implementation of risk and vulnerability assessments for disaster mitigation.

Local Food Production

Percentage of local food supplied from within 100 km of the urban area.

Child Care Availability

Percentage of pre-school age children (0-3) covered by (public and private) day-care centres.

Population Living in Disaster Prone Areas

Percentage of inhabitants living in a zone subject to natural hazards.

Cultural Infrastructure