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# Implementation of Smart City Standards in Indonesia

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***Abstract***

*This research seeks to examine the implementation of SNI ISO 37120:2018 on Sustainable Urban and Community Development, Urban Services, and Quality of Life, along with SNI ISO 37122:2019 on Sustainable Cities and Communities, Indicators for Smart Cities, in assessing advancements toward smart and resilient cities. SNI ISO 37122:2019, which is identical to ISO 37122:2019, functions as a complementary standard to SNI ISO 37120:2018. These standards provide a framework for assessing urban sustainability and smart city development by establishing clear, measurable indicators. The SNI ISO 37122:2019 standard consists of 19 sectors and 80 indicators, which help cities evaluate their performance in various aspects such as governance, environment, infrastructure, technology integration, and public services. By implementing these indicators, cities can systematically track their development, identify areas for improvement, and enhance sustainability through data-driven decision-making. The findings of this study highlight the role of SNI ISO 37120:2018 and SNI ISO 37122:2019 in improving urban resilience and livability. These standards enable local governments to implement best practices for smart city transformation while fostering economic, social, and environmental sustainability. Adhering to these standards also enhances global competitiveness by aligning with internationally recognized benchmarks for urban development. By utilizing these frameworks, cities can ensure better urban planning, efficient public service delivery, and a higher quality of life for residents. The study concludes that adopting SNI ISO 37120:2018 and SNI ISO 37122:2019 is crucial in shaping sustainable and future-ready cities.*

***Keywords:*** *Smart City, Standard Indicators, Urban Sustainability.*

## Introduction

Cities require indicators to assess their performance. However, existing local-level indicators often lack standardization, consistency, and comparability across different cities and time periods. This document focuses on city services and quality of life as a means of contributing to urban sustainability.

As a key component of a comprehensive series of international standards aimed at a holistic and integrated approach to sustainable development, this set of standardized indicators provides a unified framework for measuring city services, quality of life, smart cities, and urban resilience. Rather than imposing value judgments, thresholds, or specific targets, these indicators serve as a neutral tool for assessment and comparison.

Compliance with this document does not grant any special status. A city that adheres to the measurement guidelines for city services and quality of life may only claim compliance in that

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specific context.

These indicators serve as tools to track and monitor city performance over time. Achieving sustainable development requires a comprehensive approach that considers the entire urban system. Future planning should account for current resource use and efficiency to ensure better decision-making for tomorrow.

The indicators and corresponding test methods outlined in this document aim to support cities by:

a) Assess the management and performance of city services and quality of life over time;

b) Facilitate knowledge-sharing by enabling comparisons across various performance metrics;

c) Aid in policy formulation and the establishment of priorities.

**Figure 1 Sustainable development of communities Relationship between the family of city indicators standards**


The indicators are organized by thematic categories. Considering the varying resources and capacities of cities globally, the overall framework for assessing city performance is divided into "core" indicators (which must be adhered to by those implementing this document) and "supporting" indicators (which are recommended for implementation). A complete list of both core and supporting indicators can be found in Annex A, Table A.1.

This document utilizes the following verbal forms:

1. "shall" indicates a requirement;
2. "should" indicates a recommendation;
3. "may" indicates a permission;
4. "can" indicates a possibility or a capability.

**Indicator**

A measure that can be quantitative, qualitative, or descriptive.

[SOURCE: ISO 15392:2008, 3.14, modified – Note 1 to entry added.]

Note 1 to entry: This document classifies indicators into three types:

1. Core indicators: Mandatory indicators used to assess performance in providing city services and enhancing quality of life.

2. Supporting indicators: Recommended indicators that help demonstrate performance in delivering city services and improving quality of life.

3. Profile indicators: Informational indicators that provide background statistics, assisting cities in identifying relevant peers for comparison.

**Letter Review**

**SNI ISO 37120:2018 Sustainable Urban and Community Development, Sustainable Urban and Community Development**

Meanwhile, Keiner et al define urban planning as a guideline for developing space in a settlement, whether rural, urban or metropolitan. Through the quote above, Keiner et al. also development, strategies reduce the impact of market forces, both in terms of the benefits of people living or doing business in a city. strategies to reduce the impact terms benefits city.

**Community Development**

(Brokensha & Hodge, 1969; Adi, 2000) yang didefinisikan sebagai:

"Community Development is a movement designed to promote better living for the whole community with the active participation, and if possible, on the innitiative of the community… It includes the whole range of development activities in the district whether these are undertaken by government or unofficial bodies… (Community development) must take use of the cooperative movement and must be put into effect in the closest association with local government bodies."

And (Nasdian, 2014: 29):

"Community development is a movement designed to promote better living for the whole community with the active participation and on the innitiative of the community."

**Urban Services**

Indicators should be clear, easy to interpret, and based on relevant variables that remain consistent over time, ensuring reliable comparisons (Gabrielsen and Bosch, 2003; Dizdaroglu, 2015). Additionally, Yonk et al. (2015) emphasize that indicators should be derived from relevant data that allow for consistent comparison across different locations and time periods.

The proposed index was developed by integrating 41 factors, which are categorized into five key dimensions: environment, demographics, socio-economic structure, housing availability, and housing technical parameters.

**Environmental Factors**

The physical quality of the environment plays a vital role in both human health and individuals' perception of their surroundings (Kahn, 2002). Environmental factors can be broadly categorized into two groups: environmental benefits—which enhance well-being and improve overall amenities—and environmental burdens, which contribute to their deterioration and

negatively impact human health.

Environmental benefits include urban greenery, such as parks, forests, gardens, green roofs, green belts, and riverbanks. Green infrastructure is considered essential for public health due to its ability to support ecosystems and improve air quality while also reducing noise pollution (Bealey et al., 2005; Tiwary et al., 2011; Islam et al., 2017). Additionally, access to green spaces has been shown to provide cultural and recreational benefits, positively influencing mental health by promoting relaxation, reducing stress, and enhancing overall well-being (Lafortezza et al., 2009; Streimikiene, 2015).

Water bodies, including rivers and lakes, also contribute to human health and well-being. Research by Haase (2015), Grellier et al. (2017), and White et al. (2010) highlights the benefits of water-related environments, such as their role in flood control, cooling urban temperatures, managing rainwater, and mitigating climate change effects (Dugato et al., 2017; Gunawardena et al., 2017).

Conversely, environmental burdens, such as pollution, negatively impact quality of life (QoL) (Darçın, 2014). Among urban pollutants, air pollution is a primary concern, linked to respiratory infections, asthma, lung cancer, cardiovascular diseases, and increased mortality rates (Bose et al., 2018; Luechinger, 2010; Smith et al., 2013; Zheng et al., 2015). Common indicators of air pollution include levels of particulate matter (PM), ground-level ozone (Schwela, 2000; Streimikiene, 2015), nitrogen oxides (NOx) (Schwela, 2000; Darçın, 2014), sulphur oxides (SOx) (Schwela, 2000; Smith et al., 2013), and volatile organic compounds (Darçın, 2014).

In addition to air pollution, other environmental burdens, such as noise pollution, significantly impact human health. Studies suggest that exposure to excessive noise can lead to respiratory issues, insomnia, hearing loss, cardiovascular diseases, and even mental health disorders such as anxiety and stress (Aydın & Kaltenborn, 2007; Dizdaroglu, 2015; Lakes et al., 2014).

## Metodology Research

### How to use SNI ISO 37120:2018:

### Understand the Standard:

SNI ISO 37120:2018 establishes indicators of city sustainability performance, how to measure them, and relevant criteria.

a) Identify Sustainability Aspects:

Determine the aspects of sustainability to be measured, such as economic, social, environmental, and spatial.

b) Select Relevant Indicators:

Select the indicators that are most relevant to the sustainability aspects that have been identified.

c) Collect Data:

Collect the data needed to measure each indicator that has been selected.

d) Analyze Data:

e) Analyze the data that has been collected aspects that have been identified.

f) SNI which standard performance, is used city aspects of sustainability, social, and

environmental, using specific indicators.

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**2. Select Relevant Indicators:**

Select the indicators that are most relevant to the sustainability aspects that have been identified.

**3. Collect Data:**

Collect the data needed to measure each indicator that has been selected.

**4.Analyze Data:**

Analyze the data that has been collected sustainability aspects that have been identified.

**5. Make Comparisons:**

Compare city performance with other cities or with established targets.

**6. Use for Policy Making:**

Data can making better policies and programs to improve city sustainability.

**7. Monitor and Evaluate:**

Conduct regular monitoring and evaluation to ensure that city performance continues to improve.

Sustainability Performance SNI 2018

**8. Economy:**

a) Percentage of economic growth

b) Unemployment rate

c) Income per capita

**9. Social:**

a) Poverty rate

b) Life expectancy

c) Literacy index

**10. Environment:**

a) Greenhouse gas emissions

b) Energy consumption per capita

c) Air and water quality

**11. Spatial Planning:**

a) Area of green open space

b) Population density

c) Availability of public transportation

**Smart City Indicators Sni Iso 37122: 2019**

Is first standard society urban specifying definitions for smart cities? SNI ISO 37122:2019 Used in conjunction with ISO 37120 to implementing, for the purpose of:

1. responding the community;
2. applying collaborative leadership methods, working through city disciplines and systems;
3. using modern technology provide
4. providing living technologies used serve
5. ways;
6. needs
7. that is to face future

In the preparation smart city master the indicators contained in SNI ISO 37122:2019 can be used as indicators for smart city development targets together with other regional development indicators contained in the document regional planning such as RPJMD, OPD strategic plans, or sustainable development goals (SDGs) indicators.

| **Indicator Groups** | **Indicators** |
|---|---|
| | that new business continuity |
| | workforce employed |
| | workforce, research |
| | skill |
| | science, levels |
| | energy generated total |
| | generated |
| | generated processing |
| | decentralized |
| | City energy network storage capacity |
| | lamp systems |
| | restored |
| | in need of repair |
| | vehicle |
| | constructed renovated in accordance |
| | kilometer |

| | |
|---|---|
| | to monitor |
| | The annual revenue |
| | cities |
| **GOVERNMENT** | city's inhabitants |
| | city's inhabitants |
| | that are |
| | information technology |
| **Healthy** | included integrated files |
| | that has |
| | To people |
| | city providing |
| | city providing to programs aimed at |
| **SAFETY**<br>**SOLID WASTE** | Disposal center |
| | Waste |
| | Volume the that waste |
| | Function with sensors |
| | Percentage of municipal electrical and electronic waste recycled |
| | Reservations inhabitant ants |
| | beeb digitized |
| | books |
| **TELECOMMUNICATION** | adequate speed |
| | spots |
| **TRANSPORTATION** | City public roads toll roads |
| | shared |
| | City bike resident |
| | routes systems |
| | the integrated |
| | electronic |
| | parking |
| | Parking intelligent |
| | Light |
| | The is map total |
| | Registered |
| | City |
| | Suitable for |
| | Motorized |
| **TRANSPORTATION / RESILIENCE** | Number of city residents per 100,000 population per year involved in the planning process |
| **Wastewater** | that is |
| | a city |

| | |
|---|---|
| | Percentage total amount urban areas |
| | pipe |
| **water** | stations |
| | Systems urban |

Table 1. (Nasional Indonesian Standard) SNI ISO 37122:2019 on Smart City Indicators

## Conclusion

The SNI ISO 37120 standard serves as a key reference for the management of smart and sustainable cities. This standard establishes requirements for urban service indicators and quality of life, enabling cities to measure and compare their performance with others at both national and international levels. By implementing this standard, cities can enhance governance efficiency, urban planning, and public services based on accurate and measurable data. Additionally, SNI ISO 37122:2019 is a complementary standard that focuses on smart city indicators. This standard is designed to ensure that cities adopting digital technologies can improve service efficiency, transparency, and public participation in decision-making. Compliance with this standard allows cities not only to enhance their residents' quality of life but also to optimize resource utilization through technological innovation and data-driven approaches. Compliance with SNI ISO 37120 and SNI ISO 37122:2019 offers numerous benefits for urban management. One of the key advantages is helping cities identify strengths and weaknesses in public service systems, enabling more effective improvements. Furthermore, by adhering to these international standards, cities can boost their global competitiveness, attract more investments, and create a more sustainable and livable environment. Implementing these standards also requires the integration of technology, information systems, and reliable data to support evidence-based decision-making. Thus, cities that adopt SNI ISO 37120 and SNI ISO 37122:2019 can achieve better governance while promoting sustainable economic growth.

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