

Assessing the Physical Aspect of Smart Environment Implementation in Phase II of BSD City

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ABSTRACT

As one of the countries with the largest population in the world, urban issues in Indonesia are linearly proportional to the needs of fulfilling the lives of its people so that the problems are quite complex and in solving them requires the role of various parties, such as experts, the government, builders and managers. the city, to the community itself. In urban problems, of course it is closely related to the need for a good environment to facilitate the survival of the community. Keeping up with the times and the needs of society which need to be met instantly because movement is always fast, without forgetting continuity with urban nature, demands development and management of cities that are also efficient and effective. Smart Environment is one of the dimensions in the application of the Smart City concept which can be a reference in creating a smart city environment by focusing on knowledge-based environmental protection and management efforts supported by Technology, Information and Communication (ICT). Smart Environment is a dimension of Smart City that is very close in scope to the realm of architecture. In this research, Smart Environment will be reviewed from several theories and precedents both in how the concept is applied and how to evaluate it. Meanwhile, the case study taken in this research was in BSD City Phase II as material for evaluating the implementation of Smart Environment in sub-urban areas.

Keywords: Smart City, Smart Environment, Sustainable

INTRODUCTION

Starting from Indonesia's awareness regarding world climate issues and its commitment to signing 'The Paris Climate Agreement' as well as urban issues in Indonesia itself, which is now ranked 4th as the country with the largest population, namely 277,534,122 people, the Indonesian government invited experts in this field to discuss to produce solutions related to urban development and operations effectively and efficiently. At the end of the discussion, creating a national program called "100 Smart Cities" in which this program invites and requires cities in Indonesia to start implementing the 'Smart City' concept in their urban life. This is reinforced by the nation's foundations which are stated in the Preamble of the 1945

Constitution of The Republic of Indonesia, which in part reads “*to educate the life of the nation*”.

Smart City is an intelligent city concept where in its implementation there is an integrated contribution of information technology to facilitate urban life. In theory, Smart City has six main dimensions, namely Smart Economy, Smart People, Smart Governance, Smart Mobility, Smart Living, and Smart Environment. Adapting to the main aspects of urban life related to the built environment and its living creatures as well as the suitability of the field of study pursued by researchers, directs this research to focus more on discussing aspects of the Smart Environment.

The reason why the researcher took a case study in the BSD City Phase II area was because the results of the researcher’s observations were only supported by several data and facts in the field. Physically, BSD City Phase II appears to have implemented good harmony between nature and human life in it, green open space that is able to balance human activities in it, as well as the presence of green buildings in the middle of the city.

Therefore, based on the physical aspects that can underlie the creation of a Smart Environment, this research will focus on assessing the availability and success of these physical factors in building BSD City Phase II into a city that is able to implement a Smart Environment well.

LITERATURE REVIEW

A. Smart City

Based on the book “The origin of the Smart City imaginary: from the dawn of modernity to the eclipse of reason” by Federico Cugurullo, it explains that Smart City first appeared in the city of Los Angeles, which in 1970 was developing a data-based city (Big Data). In Indonesia itself, the Smart City concept was developed by Prof. Dr. Ir. Suhono H. Supangkat, M.Eng., a Professor at the Faculty of Electrical and Information Engineering, Bandung Institute of Technology, in 2015. Although the initial focus of developing the Smart City concept as an urban solution was related to developments in the field of Information and Technology (IT), in line with As time goes by, this aspect can be included in many urban aspects, one of which is urban architecture.

From several literature reviews, such as from UNECE & ITU (2015) and ASEAN (2022), it can be concluded that Smart City is a form of sustainable urban development and innovation that utilizes technology as a means of information and resource utilization based on the city’s ability to know, understand , and manage problems to improve the quality of life and city services.

B. Smart Environment

As explained in the book “Smart Environment for Smart Cities”, Smart Environment is a knowledge-based environment that is able to be aware of problems, able to always provide information to the public, and satisfy the lives of city residents by

improving public services, mobility, saving energy, empowering resources. power, to help improve the city’s economy.

Regarding the indicators of the Smart Environment dimension, researchers reviewed two main theories, namely the Garuda Smart City Maturity Model (GSCMM) and the Journal “Smart Environment Program, Smart Way to Smart City” by Tutik Rachmawati and Priska Diah Pertiwi.

According to the Garuda Smart City Maturity Model (GSCMM), there are three main indicators in implementing a Smart Environment, including Energy, Environment and Spatial Planning. Meanwhile, according to Tutik Rachmawati and Priska Diah Pertiwi, there are eight main indicators, including Public Open Space, Waste Management, Slum Management, River Revitalization, Eliminating ‘Chopstick Syndrome’ in Building Construction, Alternative Energy, Reducing CO2 Production, and Urban Agricultural Land .

METHODOLOGY

From the indicators that GSCMM has as well as the Journal “Smart Environment Program, Smart Way to Smart City” by Tutik Rachmawati and Priska Diah Pertiwi, it directs researchers to group them so that the results of these two theories can produce research variables.

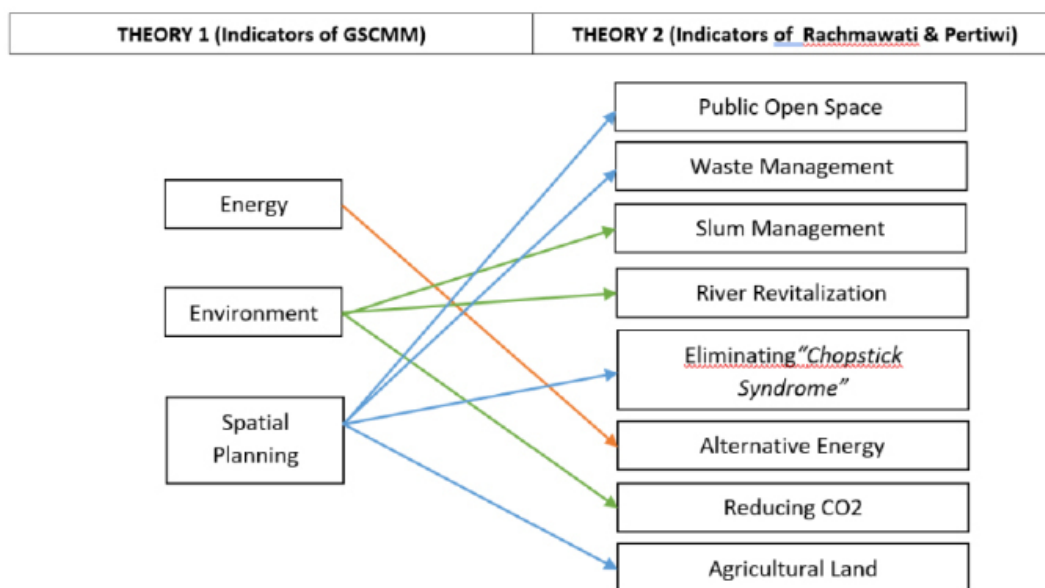


Image 1 The Synthesis of GSCMM and Rachmawati & Pertiwi’s Indicators.
 (Source: Researcher, 2024)

From the results of the synthesis of these two indicators, sub. indicators as in the table below. This is because researchers try to find similarities in points of consideration from the two theories in realizing a good Smart Environment, so that these similarities can be used as research variables.

Table 1 Research Variable Table. (Source: Researcher, 2024)

Garuda Smart City Maturity Model Smart Environment Indicator (GSCMM)	Sub. Smart Environment Indicator Garuda Smart City Maturity Model (GSCMM)
Energy	1. Application of the concept of sustainability in city development
	2. Energy efficient housing
	3. Energy efficient industrial, commercial and office buildings
	4. Management of natural resources
	5. Alternative use of fossil energy
Environment	1. Cities protect nature
	2. City ecological preservation system
	3. Cultural preservation system
	4. City waste management system
	5. Household waste management system
	6. Industrial waste management system
	7. Air pollution management system
	8. Disaster detection and management system
	9. River revitalization
	10. Sense of ownership and responsibility of city residents towards their environment
Spatial	1. Spatial layout according to RTRW
	2. Providing Green Open Space (RTH)
	3. Management of slum areas
	4. Urban agricultural land
	5. City image

To adjust the main discussion in the research from the research variables, namely related to the physical aspects of the Smart Environment indicators, researchers will discuss five indicators, namely 1) Cities protect nature, 2) River revitalization, 3) Providing Green Open Space, 4) Urban agricultural land, and 5) City image.

RESULT & DISCUSSION

From the results of studies conducted on literature studies, researchers were able to produce research variables that could be used as evaluation indicators for the implementation of Smart Environment in the BSD City Phase II area, these variables are as in the table below.

From these indicators, researchers will focus on physical aspects that can be observed in the form of architectural aspects with the five human senses, the sub-indicators in question are: City protecting nature, River revitalization, Provision of Green Open Space (RTH), City agricultural land, and Image city.

1. Cities Protect Nature



Image 2 Main Street of Phase II of BSD City. (Source: Researcher, 2024)

In an effort to protect nature, as explained in the 2023 Sustainability Reports, as a member in establishing the Indonesian Green Building Council, BSD City is committed to prioritizing efficient energy, architectural design practices and the use of environmentally friendly materials, expanding green areas and planting trees, as well as conservation water. So, not only running it, BSD City also acts as a supervisor, to ensure that projects developed are in line with global standards, optimize utilities, and also uphold environmental standards. This reality can be ascertained by looking directly at green buildings that utilize passive design in their design.

2. River Revitalization



Image 3 Waste Water Drainage. (Source: Researcher, 2024)



Image 4 WTP Sempora. (Source: Google, 2024)

The aim of river revitalization is to restore the role of rivers in the life of the environmental ecosystem, one of which is drainage. In this case study area, namely BSD City Phase II, there is a main river right on the eastern border, namely the Cisadane River. In water management in the BSD City area, most of the waste water will be managed first through the Water Treatment Plant (WTP) and then flowed back to meet the community's water needs until finally the final waste from water use, of course the release has also been measured, will be distributed to The Cisadane River is small in volume so it does not have a significant impact. This can be well observed by looking at the physical health of the river with good river flow, the absence of rubbish, and the use of river tributaries as part of projects being developed such as The Breeze (Lifestyle Mall).

3. Providing Green Open Space



Image 5 Green Area in front of ICE BSD. (Source: Researcher, 2024)

In providing green open space itself, BSD City divides it into several areas, such as:

1. Garden area and pool
2. Common green areas
3. Commercial green area
4. Green area of housing projects
5. Road divider
6. Green area by the river

This can be seen from the harmony of the green open space with the existing projects in BSD City Phase II and how the surrounding trees still provide shade for people to carry out their activities.

4. Urban Agricultural Land

Reporting from the official Sinar Mas Land website, regarding the agricultural sector, the company has aligned thoughts in supporting the Indonesian government's food security efforts, thus making the company ambitious in providing and managing agricultural land. In cultivating this agricultural land, Sinar Mas Land collaborated with the community to form farmer groups and also built integrated food halls. However, if we adjust to the scope of the case study used in the research, the results of the observations made by the researchers did not obtain data that in BSD City Phase II there were areas that were used as urban agricultural land.

5. City Image



Image 6 The City View of Phase II of BSD City. (Source: Researcher, 2024)

As one of the pioneer members of the Green Building Council in Indonesia, BSD City has set itself to meet their targets in implementing green building practices, using sustainable-friendly materials, and expanding Green Open Space (RTH). Apart from that, BSD City is also trying to become an independent city that carries the Integrated Smart Digital City concept. This can be seen from how the architectural design of the building is realized as well as its harmony with nature which is able to make BSD City one of the suburbs that people are interested in living in.

CONCLUSION

From the results of the discussion, it was found that BSD City Phase II is physically capable of fulfilling four of the five aspects that form a Smart Environment physically, including 1) The city protects nature, 2) River revitalization, 3) Providing Green Open Space, and 4) City image. Meanwhile, the aspect that cannot be fulfilled is related to agricultural land. This indicates that BSD City Phase II has implemented Smart Environment well, which is in line with supporting BSD City's own commitment to creating an integrated intelligent independent city as well as Indonesia's commitment to climate issues. Not only physically, non-physical things also influence the success of city maintenance, such as operational management, company and community programs, and public awareness.

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