Lost space as an inhibiting factor for city sustainability

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M Tharziansyah*, G N Sarbini and N Nurfansyah

Department of Architecture, Faculty of Engineering, Lambung Mangkurat University, Indonesia

*tharziansyah@ulm.ac.id

Abstract. The formation of urban slums is caused by a culture of irregular configuration of land arrangements. Many are found in old cities, does not correspond to urban planning, including in Banjarmasin. Irregularity in land patterns and natural conditions of swamps and river flows, forces organic linear development, following patterns of roads and river flows. The formation of lost spaces makes it difficult to develop sustainable cities. This study aims to see how the pattern of lost space in the city of Banjarmasin causes the formations of irregular areas and spaces within the cityscape, which make the cityscape even worse. The unit of analysis is divided by subdistrict areas. The focus of the research lies in lost space which is categorized based on the level of accessibility that is low or difficult to reach. Data collection methods include, 1) common data collection to reveal preliminary conditions; 2) field observation and literature study; 3) field survey; and 4) mapping and measuring. Data of lost spaces are compiled into 2 parts accordingly to its positions and dimensions. Methods of urban solid and void are used to identify forms of lost spaces. Analysis of lost spaces are categorized in three conditions, 1) mild; 2) moderate; and 3) severe. Almost all districts in Banjarmasin has lost space units; Central Banjarmasin District 87 spots, West Banjarmasin 60, South Banjarmasin 51, North Banjarmasin 62, East Banjarmasin 79. A lot of lost space is located some distance from the main road, while the most size is more than 1000 m². There are 5 types of lost space: square, rectangular, L shaped, U shaped, and irregular. The irregular shape is very dominant. The results of this research show that such a wide lost space, difficult position and irregular shape is very difficult in the arrangement of a sustainable city of Banjarmasin.

1. Introduction

The formation of urban slums are caused by the chaotic conditions of spatial structure, affected by the existing natural conditions of riverways and peatlands. On one side, settlement patterns simulate the riverways, on the other side, simulate the road networks. As the city area grow and become dense, wasted unused lands emerge. These unused spaces and landsare defined as *lost space*. Lost spaces may be in forms of unorganized landscapes, found in waterfronts,indutrial districts on the outskirts of the city, residual spaces rarely accessed, and spaces in between commercial dan residential areas [1]. Many lost spaces are found in Banjarmasin, they are very difficult to develop, hard to reach, with formations of irregular shapes. Buildings are concentrated alongside roads and riverbanks. Lost spaces are obstacles in developing sustainable cities.

Studies on lost space has been conduted by many researchers, varying in aspects of the study.Some researcher focus on seeing lost spaces as under managed spaces analyzing its contemporary oerspective [2]. Other studies stresses on community perception as samples on lost spaces to determine factors causing the formations of lost spaces to formulate remedies to overcome lost spaces [3]. Although

categorized as negative spaces, lost space can be developed and regulated into positive, useful spaces [4]. Several other studies aim to fix and revitalize lost spaces [5,6].

This study is conducted to identify the spread, dimension, and shape of lost spaces in a city of distinct cultural background, unique natural conditions with its rivers and peatlands, to ease spatial planning and development of the city.Lost spacesare constraining factors in urban sustainability. Major interventions are needed to revitalize lost spaces.Cities could investigate environmental functions to be distributed in the urban fabric and interconnected by the considered design of negative space [4].

2. Research methodology

This research conducts many empirical spatial observations on the cityscape to specify lost spaces. Measurement of lost space areas uses digital maps provided by Google Maps, which is then remeasured and modified using Corel Draw. Lost Space refers to 2 criterias: (1) broad; without form, without boundary and continuous edge, incomprehensible and incapable of connecting with urban elements, and etc; (2) un used spaces that is isolated from the flow of walking activities, abandoned and left areas that have lost their original nature, spaces that do not have a guardian, etc [1,7]. Empirical data collection is carried out by 12 groups of students spread in 5 subdistricts. One group consists of 6 to 7 students. They observe, take documentation, and estimate the sizes of lost spaces. Several lost spaces cannot be accessed due to building closures, or located in deep swamp. In cases of these difficulties in accessability, digital satellite photos will used.

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Analysis of lost space characteristics uses urban solid and urban void mapping analysis [1,8]. In the map,solid black elements refer to buildings, while white indicating open spaces. The map reveals categories of lost spaces.Measurement data are fed into a table, while forms of lost spaces are drawn into graphics.

3. Results and discussion

Banjarmasin (established in 1526) is the oldest city in Kalimantan. In the beginning, settlements were concentrated on riverbanks. In its development to present day, settlements grew away from riverbanks. The urban fabric of Banjarmasin is shown in Figure 1. Figure 2 shows the irregular settlement patterns developing into negative spaces, identified as lost spaces.

Figure 1. Banjarmasin City, Indonesia.

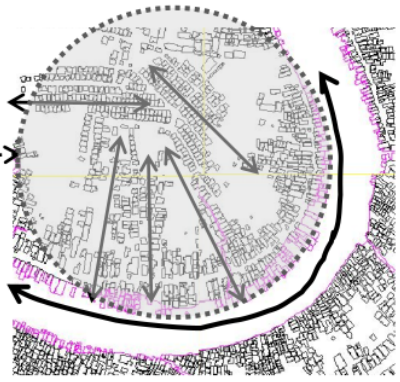

Figure 2. Irregular pattern in urban settlement.

3.1. Dimensions and distribution of lost spaces

Lost spaces are found in all 5 subdistricts of Banjarmasin. There are various shapes and sizes, so to group them would end up with in too many variants. Figure 3 shows spots of lost spaces spread in all five subdistricts. Black dots in the picture shows the location of the lost spaces. Table 1 below reveals amount of spots of lost spaces, identified totalling to 339 spots, measuring 48.2 hectares. Most number of lost spaces are found in Central Banjarmasin, and the largest area of lost spaces are found in west Banjarmasin.

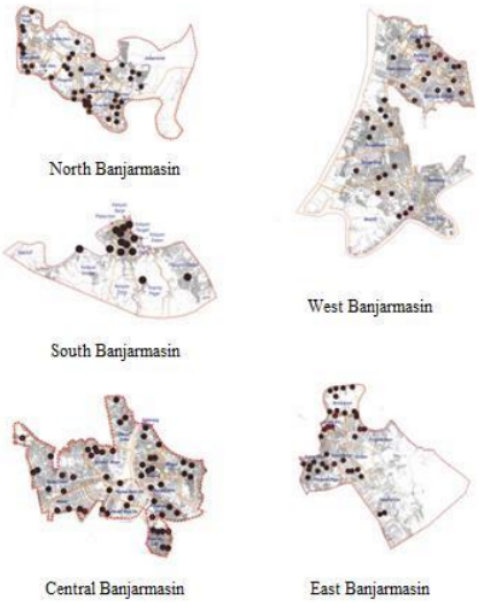

Figure. 3 Distribution of lost space.

Table 1. Spots and Size of Lost Space

Subdistricts	Number of Spots	Size (Ha)
North Banjarmasin	62	3,1
South Banjarmasin	51	1,6
Central Banjarmasin	87	6,2
West Banjarmasin	60	19,5
East Banjarmasin	79	17,8
Sum	339	48,2

Most number of lost space spotsare located in Central and East banjarmasin subdistricts. While the largest sizes of lost spaces are found in West and East Banjarmasin subdistricts.

The distribution and number of lost spaces are spread wideand equally throughout the city, the fixture of these spaces need to be done integratedely between all subdistricts. All lost spaces inhibit different characters. By its position, there are 3 types of lost spaces: (1) far from main roads, (2) near to main roads, and (3) alongside main roads. The 2nd type is found dominant in Banjarmasin. Based on size, the majority of lost spaces are measured less than 1000 m^2, as shown in Table 2.

Table 2. Types of lost space by its position.

`Subdistricts	Position [to Roads]		
	1	2	3
North Banjarmasin	7	38	17
South Banjarmasin	3	41	7
Central Banjarmasin	20	59	8
West Banjarmasin	2	34	14
East Banjarmasin	20	54	5

Type 1: near main road

Type 2: along main road

Type 3: far from main road

Three types of lost spaces shown in table 2 are significant data in urban planning. Type 2 are common types found in all subdidtricts

Table 3. Types of lost space by area measured.

Subdistricts	Size [Hectares]		
	A	B	C
North Banjarmasin	0	8	54
South Banjarmasin	0	3	48
Central Banjarmasin	1	11	75
West Banjarmasin	4	10	46
East Banjarmasin	6	17	56

Type A: > 0,5 Ha

Type B: 1000 m^2– 0,5 Ha

Type C: < 1000 m^2

Table 3 shows most area sizes of lost spaces are of type C, and are most found in Central Banjarmasin totalling 75 hectares.

3.2. Shapes of lost space

This study reveals shocking findings of lost space shapes. Hundreds of irregular shapes of lost spaces were observed, as shown in Figure 4. The figure below showing forms of black blocks indicates shapes of lost spaces obtained by field tracing and mapping. This shows that not only the patterns of settlements are sporadic and irregular, lost spaces are also irregular in its shape. These conditions become obstacles to improve the living environment.

Figure 4. Shapes of lost space.

Figure 5. Conditions of research objects, a) the densed city; b) lost spaces, difficult to access; c) lost spaces as negative spaces.

Figure 5a reveal that the city of Banjarmasin is quite densed with buildings, and in the midst of this density, lost spaces exists. Figure 5b is an example of lost spaces found within the urban environment, difficult to reach, inaccessible. Figure 5c is an example how lost space evolves into neglected, dead space that are very difficult to utilize, due to its inaccessability.

4. Conclusion

Based on the discussion above, lost spaces are formed by disorganized settlement patterns, affected by irregular lineage of the riverways and roads. If the lost spaces are to be ignored, this may consequently lead to the degradationof spatial value and the environment, these unmaintainable, negative spaces by the end may become waste disposals. Lost Spaces can be revitalized into postive, useful spaces, for social and communal activities, if the patterns of settlements can be restructured.among the concepts that canbe applied is land readjustment system. Data on lost spaces are crucial, and can be used as references in urban planning and design, and also important to be acknowledged by the people and private sectors. Advanced research in lost spaces can be related to land ownership, and how it contributes in shaping settlement patterns.

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