Measuring urban slum area imageability through visual indicators

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Abstract. Imageability is the quality of a place that makes it recognizable, memorable, and different from other places. It determines the character and identity of city space. On the other hand, slum settlements are a severe problem in several countries worldwide. Urbanization makes urban space denser and causes disorder if there is no good urban spatial development. This condition then affects the image of the city, which becomes less good, disorganized, and has no character. In its role, good quality (non-slum) urban settlement will improve the image of the city. However, in the context of slum settlements in Indonesia, under certain conditions, it can have good imageability as part of the identity of urban settlements. This paper aims to assess the imageability of the slum area of Mojo Village, Surakarta City, which will be used as a basis for settlement upgrading. This study uses a qualitative method with a visual assessment survey using the main parameters of the condition of the open space and buildings. A visual assessment survey is a survey to assess visual quality by observers with predetermined assessment criteria. This study found that predominantly settlement neighborhoods have low imageability, but some places have high imageability.

Keywords: imageability, slum, urban slum area, visual indicators

1. Introduction

The city of Surakarta in Central Java is one of the cities facing the problem of slum settlements. Based on the Decree of the Mayor of Surakarta Number 640/69.9 concerning the Location of Slum Settlement in Surakarta City, Surakarta City has eight areas spread over 29 villages, including slum areas with a total area of 135.97 ha. The Semanggi area is included in the largest slum area, with 35.45 ha spread over the Kedung Lumbu, Sangkrah, Semanggi and Mojo Villages [1]. Mojo Village is a division (pemekaran) of Semanggi Village in 2018. In 2020, the settlement area of Mojo Village was in the City Without Slums (KOTAKU) program of the Central Java Provincial Government. The program focuses on constructing new livable housing on previously cleared land and the construction of supporting infrastructures such as roads, sanitation, drainage, garbage, clean water, and fire mitigation.

In the 1960s, Kampung Silir was located in the Semanggi Village (before the division) and became a place of localization (prostitution) [2]. Historically, during the independence period, the city government tried to eliminate the practice of prostitution, which was rampant in the city of Surakarta, with various regulations and policies. However, this effort was considered less than optimal. In 1997, the localization was officially closed by the government. Furthermore, the government is trying to improve the population's skills to find a more decent income. The government also turned the area into a center for selling animals (chickens and goats) and used goods. Over time, there was also the construction of educational facilities, health, and several government agencies. Mojo Village itself
dominates residential areas located in suburban areas (Figure 1). Even so, the Mojo village, with its mixed-use function is expected to be able to support the city in realizing a liveable city.

![Figure 1. Mojo District Context in Surakarta City](image)

In recent years, this area has received the KOTAKU program, a slum environmental upgrading program from the government. Some slum criteria have been handled well so that some RTs are no longer included in slum areas, while in other areas, they are still classified as slum areas because they have not received more attention (Figure 2). Even so, the imageability of the area is not considered suitable as a built environment area. Apart from the delineation of slums, several buildings, mainly commercial functions, are in poor condition, making the visual image less suitable.

Imageability in Mojo District needs to exist and be improved because Mojo is a suburban settlement area that tends to be densely packed. Most of the residents get their income from the economic sector around settlements. Some residents sell in the markets, become casual laborers, and have commercial activities along the corridor, as well as in the informal sector, such as food stalls and angkringan. With high imageability, it will increase people's interest to come and conduct economic transactions. In addition, it certainly increases the sense of belonging to the place and builds good social relations with fellow residents and visitors. An excellent urban environment should have a good image to support the city's liveability both economically, socially, and environmentally. This research needs to explore the factors that influence the urban space imageability so that these factors can be the basis for improving the existing conditions of imageability. This research aims to assess the imageability of the urban slum area environment by looking at its physical elements.

![Figure 2. Slums visual condition in Mojo District](image)

2. Literature Review

Imageability is the quality of a place that makes it recognizable, memorable, and different from other places [3]. A place has high imageability when certain physical elements and arrangements attract attention, evoke feelings, and create a lasting impression [4]. The image of the city is formed based on
the response between residents and environmental, economic, social, and technological developments that reflect the local climate in the city [5]. The image of the city is also related to the ease of orientation and feelings of security and comfort in the city [3]. The development and growth of the city is a continuous process so that its shape, character, and image develop over time as a result of the development of urbanization with a paradigm shift [6].

There are four important roles when the city has a clear city image. First, is the mobility function, which allows people to move easily. Second, the image serves as a broad frame of reference for the structural knowledge of the city and the activities within it. Third, is the emotional function where a clear image allows a person to move into the city with a sense of comfort, ease, and emotional security. Finally, the image of the city has a symbolic function by providing symbols and strong associations with a place [7] [8]. Those can support the community to interact well with the environment. Therefore, to maximize the relationship between humans and their environment, the city must be designed to maximize its image by considering the factors that make up the city’s image [9].

3. Methods
The research method used is a qualitative method for the assessment of imageability. Previously, slum areas had been assessed to see the latest slum conditions with slum criteria from government regulations. Imageability parameters are public open spaces, significant landscape features, buildings with signage, buildings with non-rectangular shapes, and the presence of outdoor dining [4] (Table 1). These physical elements will be mapped in a predetermined delineation of slum locations.

3.1. Visual Assessment Survey
Researchers will assess the condition of imageability based on field observations to see the physical aspects as visual indicators. Visual appraisal attempts to measure how individuals perceive their environment and better understand what individuals value in their environment, also adding another important quality [10]. Researchers will use a Likert scale of 1-5 with particular criteria for each parameter (Table 1). These assessment criteria describe the condition of the physical elements as visual indicators in each parameter.

| Parameter                  | Variable            | Indicator  | Assessment Criteria (1-5)                                      |
|----------------------------|---------------------|------------|---------------------------------------------------------------|
| Public Open Spaces         | - Courtyard         | - Plaza    | 5 : Open space is very active, has a local character, and complete street furniture |
|                            | - Park              | - Garden   | 4 : Active open space, has a particular character, complete street furniture |
| Open Spaces                |                     |            | 3 : The open space is active, does not have a particular character, and the completeness of the street furniture is sufficient |
| Major landscape features   | - Riverbanks        | - Embankment| 2 : Open space is not active, has no character, minimal street furniture |
|                            | - River bridge      |            | 1 : Abandoned open space (not designed), has no character, no street furniture |
|                            |                     |            | 5 : Landscape elements are very well designed, and have a local character |
|                            |                     |            | 4 : Landscape elements are well designed and have a specific character |
|                            |                     |            | 3 : Landscape elements are handled quite well but lack a specific character |
|                            |                     |            | 2 : Landscape elements are not well managed, and have no character |
|                            |                     |            | 1 : Abandoned (not designed) landscape elements, characterless |
### Parameter: Outdoor dinings
- **Food stalls**
- **Angkringan**
- **Cafe**

| Assessment Criteria (1-5) | Description |
|---------------------------|-------------|
| 5 | The food stall has a local character, neat and well-maintained |
| 4 | The food stall has a particular character, is neat and well-maintained |
| 3 | The food stall does not have a specific character but is neat and well-maintained |
| 2 | The food stall has no character; it is neat but not maintained |
| 1 | The food stall has no character, is untidy and unkempt |

### Parameter: Buildings with non-rectangular silhouettes
- **Buildings with trapezoid silhouettes**
- **Buildings with triangle silhouettes**
- **Buildings with circular/curve silhouettes**

| Assessment Criteria (1-5) | Description |
|---------------------------|-------------|
| 5 | Buildings with regular shapes, clear styles, well-maintained buildings, with local characteristics |
| 4 | Buildings with regular shapes, clear style, well-maintained buildings |
| 3 | Buildings with regular shapes, clear style but not well maintained |
| 2 | Buildings with irregular shapes, unclear style but well-maintained |
| 1 | Buildings with irregular shapes, unclear style, poorly maintained buildings |

### Parameter: Buildings with identifiers
- **Residential**
- **Commercial**
- **Office**
- **Worship**

| Assessment Criteria (1-5) | Description |
|---------------------------|-------------|
| 5 | Buildings with permanent signage, distinctive character, clear and neat |
| 4 | Buildings with permanent signage, clear and tidy |
| 3 | Buildings with permanent signage, clear but untidy |
| 2 | Buildings with temporary signage, clear but untidy |
| 1 | Buildings with temporary signage, unclear and untidy |

### 3.2. The study area

The research locations are RW 01, RW 02, and RW 03, Mojo Village, Pasar Kliwon District, Surakarta (Figure 3). The location has potential commercial points such as a chicken and goat market, a place to sell used goods, Klithikan Notoharjo Semanggi Market, and the most significant selling scrap iron in Surakarta, namely Pasar Besi Tua Semanggi (Figure 4). In several locations, there is a dominance of the Mojo Village residential area, where some of them are in seedy condition according to the Mayor's Decree on the Location of Slum Settlement in Surakarta City. Observation spots are buildings and areas according to the imageability parameters, and the spots are marked with numbers sequentially that mark the order of assessment from beginning to end (Figure 5).
4. Results and Discussions

4.1. Current slum condition in the area

The last slum assessment by KOTAKU was carried out in 2020, and since 2017 the government has begun upgrading slum areas in this Mojo village. Until 2022, there have been many improvements to reduce slum conditions. Therefore, the researcher reassessed the slum areas, especially RW 01, 02, and 03. The current condition of slums is as follows (Figure 5).
4.2. Visual assessment

This section describes a visual assessment of the Mojo slum neighborhood, including buildings with commercial, office, government, and religious functions following the parameters of imageability.

4.2.1 Public open spaces assessment

Variable: public open spaces
Indicator: courtyard, plaza, park, garden

Photo and Assessment:

Spot 1. Score: 2. Sitting area in the alley. Residents use this area for sitting back and chatting with neighbors. This place is only active in the evening or at night after finishing work. The design and materials are made improvised without any special processing.

Spot 2. Score: 2. The sitting area on the edge of the embankment and the embankment's mound area is slightly reduced to create a sitting area with simple processing. Some embankment areas are already mossy, and there is no unique street furniture.

Spot 3. Score: 3. A small park at RW 03 as a reading garden. A small gazebo with a pyramid roof and a sitting area made of cast concrete with a wood-like finish. Unfortunately, the garden design is not so attractive.

Spot 4. Score: 2. The open area on the riverbank is used to play archery with the target board. However, there is no special treatment on the site because this area is a riverbank conservation area by BBWS Bengawan Solo.

Figure 6. Visual assessment result of public open spaces
4.2.2 Major landscape features assessment

**Variable**: Major landscape features

**Indicator**: Riverbanks, embankment, river bridge

**Photo and assessment**:

**Spot 5**: Score: 2. The embankment area near the residence was built with government assistance. The back of the embankment has not been treated at all and there are piles of building materials. There is already a railing but with an unattractive color finish.

**Spot 6**: Score: 4. The landmark of the Rajamala boat behind the embankment is a symbol of the valor of the boat belonging to the Surakarta Kasunanan Palace. Historically, Rajamala Boats have sailed rivers on the island of Java as a means of trade.

**Spot 7**: Score: 2. The area along the river is planted with corn, cassava, and banana trees by residents. There is also a chicken coop and a small hut for shelter. The condition of the bank has not received a special arrangement.

**Spot 8**: Score: 3. The Mojo Bridge connects Solo with Mojolaban District, Sukoharjo. There is no special design on the bridge, but there is a small gate on the bank of the river, which served as a pier and a crossing in the past. In history, this gate has been a barrier between the capital of the Surakarta Kasunanan Palace and the surrounding area. Unfortunately, the condition is neglected and not maintained.

**Figure 7.** Visual assessment result of major landscape features
4.2.3. Outdoor dining assessment

**Variable**: Outdoor dining

**Indicator**: Food stalls (warung makan), angkringan, cafe

**Photo and assessment**:

**Spot 9.** Score: 1. A food stall with a cart selling on the shoulder of the road in front of Khrithakan Notohardjo Market. The condition of the place to eat is not well organized.

**Spot 10.** Score: 1. A food stall near the Old Iron Market. The food stalls are also not well organized with modest signage.

**Spot 11.** Score: 2. Angkringan food stall attached to an empty building. The way to install an angkringan tent is unique and is located in the middle of empty land so that it can attract attention.

**Spot 12.** Score: 2. Angkringan food stall near the MUI Mosque. The installation of a neat tent with the front serves to convey the name of the angkringan and the menu list. However, its location on the shoulder of the road makes pedestrians passing by less comfortable.

**Figure 8.** Visual assessment result of outdoor dining
4.2.4 Buildings with non-rectangular silhouettes assessment.

**Variable**: Buildings with non-rectangular silhouettes

**Indicator**: Buildings with trapezoid silhouettes, buildings with triangle silhouettes, buildings with circular/curve silhouettes

Photo and Assessment:

**Spot 13.** Score: 4. Junj MUI Mosque with ornamentation of a typical mosque arch fence and a pyramidal roof with a dome. The mosque area is quite shady and well-maintained. Unfortunately, the dome roof design does not characterize the architectural characteristics of the Javanese mosque with its tajug roof.

**Spot 14.** Score: 3. The building selling iron and used goods is part of the Semanggi Old Iron Market. The gable-roofed building is typical of industrial buildings but does not show any unique character. The building has a distinctive facade character in the form of zinc, galvalume, or cast wall material without finishing.

**Spot 15.** Score: 2. Residential building with 1st-floor functions as a grocery store and a chicken slaughterhouse. Facade materials use brick walls without finishing and bamboo blinds in poor condition. Coupled with the irregular condition of the temporary building signage.

**Spot 16.** Score: 2. A used iron selling building with a facade in the form of corroded zinc. Buildings with simple gable roofs do not show any style or unique character. The arrangement of selling goods in the form of a car tub is arranged quite neatly.

**Figure 9.** Visual assessment result of buildings with non-rectangular silhouettes.
4.2.5 Building with identifiers assessment

**Variable**: buildings with identifiers

**Indicator**: residential, commercial, office, worship

**Photo and Assessment:**

![Spot 17](image1.png) **Score**: 5. Koramil 05 Pasar Kliwon with a traditional architectural style roof named Gedhong Jene, a blend of Javanese and European. The condition of the building is also neat and well maintained with clear and permanent signage.

![Spot 18](image2.png) **Score**: 4. The building of the Semanggi IKM Sentra pendhopo has the Joglo Jompongkan architectural style with the typical Kawung batik facade of Solo. The building is neat and well maintained, but the central building at the rear has not been utilized properly.

![Spot 19](image3.png) **Score**: 2. Formerly used iron warehouse building which has become a commercial kiosk/shop. The building has a distinctive character with a zinc facade, unfortunately, the condition has started to rust. The condition of the signage is also irregular.

![Spot 20](image4.png) **Score**: 1. Slim Chicken Market is in unkempt condition. There is a small chicken statue landmark at the chicken entrance gate. The dominant building materials use galvalume, zinc and bamboo slats which are in poor condition.

**Figure 10.** Visual assessment result of building with identifiers.

From the imageability assessment in the Mojo residential area, it can be seen that on the parameters of public open space, the major landscape features and buildings are in poor condition. On the parameters of public open space, several open areas are managed independently by the community with improvised designs without any unique creations or innovations. Even though public amenities are an important factor in creating good quality urban space [11]. In the parameters of the main landscape elements, the majority have not been designed or are in an abandoned condition. However, some spots are used by the community for farming and as a means for children to play. Those are related to the freedom to do activities in public spaces, where the public feels free to use the space with a sense of belonging to increase their social interactions [3]. In the outdoor dining area, most food stalls have not been arranged, and there is no particular design where some of them occupy the shoulder area. Buildings
with non-rectangular silhouettes are in poor condition, especially in commercial buildings such as scrap iron trading buildings, because they use improvised materials. Some that are already in good condition are government buildings, such as mosques, junior high schools, as well as kindergartens and health centers.

Buildings with signage are also almost where government buildings have good quality and are well maintained with clear signage, such as the Pasar Kliwon Koramil building and the Semanggi IKM Center. Unfortunately, market buildings such as the Chicken Silir Market and Klithikan Notohardjo Market have different conditions; the buildings are not well maintained, the roads are flooded, and the material's quality is not good. Although the existence of this market is very busy with buying and selling activities, it is not surprising because the three markets are the largest in Solo City, even Soloraya. Klithikan Notohardjo Market is the largest market for buying and selling used goods, Chicken Silir Market is the largest place to buy and sell chicken, and the Old Iron Market is the center for buying and selling scrap or scrap metal in Soloraya. In Rahman's research, areas and areas along roads that are poorly maintained and less clean give a bad impression and create feelings of insecurity and discomfort for road users [11].

Even so, the Mojo residential area, at some point has a strong historical trace as part of the power of the Surakarta Kasunanan Palace in the past. The historical traces are like the gate to enter the Surakarta Palace area, which has large and small sizes as well as Rajamala boats. The large gates are located in the Grogo, Kerten, and Jurug areas, while the smaller ones are in the Solo Baru area, the Makam Haji, and one is in Mojo [12]. Kyai Rajamala boat is a boat belonging to the Surakarta Kasunanan Palace with 58.9 x 6.5 meters. The paddleboat has a length of 6.6 meters and is now stored in the Kraton Surakarta Palace area. From this assessment, it can be found that the factors that can affect the imageability of the area are the presence of public amenities, maintenance, and cleanliness [11]. In addition, historical value can also increase the imagination of urban space that represents the city's historical identity. Historic city space or urban space related to cultural heritage is the cultural capital of urban places, essential in shaping the future historical urban space [14].

Urban spaces can be designed to meet all technical requirements, but randomly combined details, materials, and colors can reduce their visual quality [15]. Moreover, technical adequacy conditions that are not met, such as minimal building maintenance and cleanliness, will further reduce the visual quality of urban spaces. In addition to working on space and detail, it is often possible to make significant quality improvements if urban spaces are designed to bring out the unique character of the location. Surakarta with a strong cultural and historical city background should have a distinctive urban space character that distinguishes it from other cities in Indonesia. New and exciting combinations are possible when urban spaces can be connected directly to water elements and riverbanks, and interaction with gardens, flowers, and landscapes; then spaces can be well-designed where appropriate to the local climatic context [15]. Trees, landscape management, and flowers play an essential role in shaping the image of the city. Trees can also define urban spaces and highlight important areas, providing shade, conditioning, and purifying the air. In another aspect, the green element in the city has a symbolic value. Its existence can convey the meaning of space-related to recreation, introspection, beauty, sustainability, and natural diversity [15]. This will at some point create comfortable and adequate public amenities.

From the discussion that has been raised, the condition of imagination in the observation spots in the slum neighborhood area is at a low level, especially in abandoned public open spaces, untreated landscape elements, irregular food stalls, buildings with non-square shapes but does not show a special character, as well as buildings with markers but in unkempt and unsanitary conditions. The observation spots with a fairly high level of imagination are found in the landscape element area with landmarks that have historical value to the city as well as buildings with unique or distinctive styles, characters, and architectural elements. The factors that affect the condition of imageability are the existence of adequate public facilities, the level of care, the level of cleanliness, and the existence of historical values.
5. Conclusion
This paper emphasizes the assessment of the imageability of the area through visual assessment surveys in the slum area in Surakarta City. The assessment is carried out based on the imageability parameter through the most influential elements, namely public open space, major landscape features, buildings with non-rectangular shapes, and buildings with signage. The research shows that the assessment of these elements shows that the dominance of the imageability value is not good. Due to the existence of public amenities that have not been appropriately managed, the level of maintenance and cleanliness is low. Some points with a high enough imageability are areas that show the historical value unique to the place. Seeing these things, certain factors become very influential on the level of imageability in urban spaces. These factors include the existence of adequate public amenities, the level of maintenance, the level of cleanliness, and the presence of historical values. The findings of this study will contribute to strengthening the imageability of the Mojo settlement area. Strong neighbourhood imageability will support increased liveability of urban space both economically, socially, and environmentally.

References
[1] Keputusan Walikota Surakarta Nomor 640/69.9 tentang Lokasi Permukiman Kumuh Kota Surakarta. Surakarta; 2020.
[2] Ardiyanto. Perencanaan Superblok di Kampung Kenteng Kelurahan Semanggi, Kota Surakarta dengan Pendekatan Neighborhood Unit. Gadjah Mada University; 2017.
[3] Lynch K. The Image of The City. Massachussets: MIT Press; 1960.
[4] Reid Ewing & Otto Clemente. Measuring Urban Design : Metrics for Livable Places. 2013. 192 p [crossref]
[5] Jawaid MF, Pipralia S, Kumar A. Exploring the Imageability of Urban Form in Walled City Jaipur. 4th Annu Int Conf Archit Civ Eng (ACE 2016). 2016;(Ace):255–61. [crossref]
[6] Jutla RS. Visual image of the city: Tourists’ versus residents’ perception of Simla, a hill station in northern India. Tour Geogr. 2000;2(4):404–20. [crossref]
[7] Jiang B. Why Can the Image of the City be Formed? 2013;103(6):1552–66. [crossref]
[8] Rahman NA, Shamsuddin S, Ghani I. What Makes People Use the Street?: Towards a Liveable Urban Environment in Kuala Lumpur City Centre. Procedia - Soc Behav Sci. 2015;170:624–32. [crossref]
[9] Gehl J. Public Spaces. Public Life. The Danish Architectural Press; 2004.
[10] Sanoff H. Visual Research Methods in Design. Visual Research Methods in Design. New York: Routledge Revivals; 2016. 1–223 p [crossref]
[11] Abdul Rahman N, Ghani I, Teh MZ, Ibrahim KA. Rethinking Urban Public Space: Physical and Functional Analysis through Visual Surveys. IOP Conf Ser Earth Environ Sci. 2020;409(1). [crossref]
[12] Kompasiana. Gapura Kota Solo - Kompasiana.com [Internet]. 2015 [cited 2022 May 17]. Available from: https://www.kompasiana.com/cahyasetiawan/552e47b76ea83409398b4572/gapura-kota-solo
[13] Merdeka.com. Kisah Sejarah Perahu Rajamala, Kapal Titanic-nya Raja Solo yang Melegenda [Internet]. 2020 [cited 2022 May 17]. Available from: https://www.merdeka.com/jateng/kisah-sejarah-perahu-rajamala-kapal-titanic-nya-raja-solo-yang-melegenda.html
[14] Nurgandarum D, Anjani CF. Legibility of Building Facades and Imageability of Historical City Center, Case Study: Bukittinggi City Center. IOP Conf Ser Earth Environ Sci. 2020;452(1). [crossref]
[15] Gehl J. Cities for People. Washington DC: Island Press; 2010.