Characteristics of the settlement brand index for improving environmental safety in Balikpapan

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Abstract. Balikpapan is no longer an oil city oriented towards oil drilling, but is limited to processing services only, and is developed through a dynamic, harmonious and green service city. In the middle of this transformation process, Balikpapan is also committed to realizing Balikpapan, a Smart City, where one of the components is Smart Branding. Economic transformation has an impact on environmental changes. The level of the environmental safety is inversely proportional to the branding of Balikpapan. The criteria for occupancy eligibility are a sense of security and comfort. Comfort in urban areas can be realized by creating comfortable spaces to live in. Before making significant efforts to develop technology for recognition of the Balikpapan smart city, it is necessary to study the characteristics of the level of residential environmental security based on one of the smart branding components. The level of the Settlement Index is analyzed using descriptive statistics with distribution pattern maps and hexagonal diagrams. The results of the analysis show variable people (55.67) and pre-requisites (49.68) show the most significant influence on the branding of Balikpapan City. Also, it is supported by economic facilities and the development of the creative industry.

1. Introduction

Balikpapan, known as the "City of Oil," has built Balikpapan into an industrial city. However, nowadays, Balikpapan is no longer an Oil City oriented towards oil drilling but is limited to processing services only. It is developed through a dynamic, harmonious and green service city [1]. The planned coastal area development also spurs the development of the service, trade and tourism sectors. The orientation of Balikpapan City's economic activities towards a leading vision in infrastructure, health, services, population, industry, trade, services, tourism, education and culture encourages the transformation of economic activities starting at the settlement scale. Changing the socio-economic structure from the primary oil and gas sector to the tertiary sector is a big challenge amid the decline in regional income. Amid this transformation process, Balikpapan is also committed to realizing Balikpapan, a Smart City, where one of the components is Smart Branding.

Changes in total economic transformation will impact welfare, an increase in the number of unemployed, an increase in the poverty rate, and an increase in the incidence of crime. Of course, the
level of the environmental safety is inversely proportional to the branding ideals of Balikpapan City. One of the human needs is the need for a sense of security in the environment. The feasibility of occupancy can be an essential aspect to improve the quality of life for a city [2]. The criteria for occupancy eligibility are a sense of security and comfort. Comfort in urban areas can be realized by creating spaces that are comfortable to live in, while security is needed in order to be able to move without fear [3]. The feeling of fear arising from threats that can be in the form of criminal acts or crimes can disrupt community activities outside the room so that the ideal concept of a city environment cannot be achieved [4]. With the City of Balikpapan's population growth rate of 1.6% per year [5], high population density has a high generation of movement from its population activities. It will impact the crime rate because the area has quite a lot of crime targets.

The crime rate of Balikpapan City from 2016-2018 was 1794 cases in 2016, 1730 cases in 2017, and 1512 cases in 2018 [6]. However, the incidence of theft crimes from 2016-2018 has always been the highest crime type compared to other types of crime, namely 580 cases in 2016, 623 cases in 2017 and 541 cases in 2018. It can be concluded that Balikpapan City has a high crime rate. Branding of the city can be understood as visual and verbal-based user perception of space and express the behavior of a place shown through the design of the place/city as a whole [7]. The smart branding strategy is closely related to tourism potential that can be used as a city icon that can be well accepted by the community [8]. Developing a city's branding, technology, and social factors must be balanced to encourage community collaboration [9]. Thus, before making significant efforts to develop technology for recognition of the Balikpapan smart city, it is necessary to study the characteristics of the level of residential environmental security based on the smart branding components.

2. Methodology
The elements that need to be explored to determine a city's brand value are Presence, Place, People, Pre-requisites, Pulse, and Potential [10]. The unit of analysis is 34 sub-districts in Balikpapan.
- Presence: a city's status in a global or international perspective and its contribution to science, culture, and government.
- Place: physical aspects owned by a city, including a comfortable climate, environmental cleanliness, city attractiveness through the beauty of the building or its buildings and parks.
- Pre-requisites: necessary facilities owned by a city, ranging from hospitals, schools, and public transportation to sports venues.
- People: the potential for openness and warmth of the people who live in the city, the ease of getting to know and joining a community about culture or language and feeling safe
- Pulse: urban lifestyle, leisure activities.
- Potential: economic opportunities and education in the city.

![Research framework](image)
This type of research is a quantitative descriptive used to analyze the security level and settlement brand index. Qualitative descriptive is carried out on the identification of the residential level brand index. The level of the Settlement Index is analyzed using descriptive statistics with distribution pattern maps and hexagonal diagrams.

**Table 1. Research variables.**

| Variables   | Sub variables                                      |
|-------------|----------------------------------------------------|
| Place       | urban structure                                    |
|             | city image elements (edge, landmark, signage, path, node) |
| Pre-requisites | health facilities                             |
|             | educational facilities                           |
|             | public transportation                            |
| People      | ethnic group                                      |
|             | security level                                    |
| Pulse       | leisure                                           |
| Potential   | trade facilities                                  |
|             | creative industries                               |
|             | economic facilities                               |

3. Results and discussion

3.1 Place
The highest spatial structure has a function as a city-scale center of government, trade and services. The second service center functions are a trade and service center, agro center, and education service center. Meanwhile, the environmental service center functions are as a trade and service center on a district scale, a health service center on a district scale, and an education center at a sub-district scale. The identified city image elements are divided into five elements; edge, landmarks, signage, paths and nodes in each sub-district in Balikpapan City (figure 2 and figure 3). Edge is a barrier that divides or unites between areas in buildings, garden landscapes, rivers, beaches, and walls. A landmark is a unique building in the form of a monument or distinctive building. Signage is a marker of an area that is drawn in the form of a direction. The path connects the main activities that are often used, and the node is a crossroads. Each sub-district in Balikpapan has at least 1 type of element forming a city image. Balikpapan City has 231 units of city image elements.

![Figure 2. Map of edge element.](image1)

![Figure 3. Map of path element.](image2)
3.2 Pre-requisites
There were nine health facilities: public hospitals, health centers, auxiliary health centers, medical centers, pharmacies, drug stores, doctor's practice places, midwives' practice places, and health. Balikpapan's largest number of health facilities is health facilities with 1252 units, and the lowest health facilities are auxiliary health center. The second aspect is the educational facilities. Educational facilities have been identified as ten types; kindergarten, primary school, junior high school, senior high school, and university. The identification results show that the number of educational facilities in the City of Balikpapan is 537 units. The third aspect is the transportation service. Transportation services that have been identified were public transportation services. Balikpapan City has seven routes that serve each area in Balikpapan City; route numbers 1, 2, 3, 5, 6, 7 and 8. Each sub-district in Balikpapan City is served by at least one public transportation route. However, several sub-districts have additional city transportation route services by considering the need for the movement to and from this sub-district and the number of city transportation cars for each transportation route.

3.3 People
People are measured based on the aspect of openness and the level of environmental security. Openness is assessed through the distribution of ethnic groups in an area. According to the 2010 population census data, it is explained that the ethnic groups in Balikpapan City consist of 11 ethnic groups scattered throughout the region with the Javanese (29.76%) and the lowest in the Gorontalo ethnic group (0.06%). The security level of residential neighborhoods in Balikpapan identified is the incidence of criminal acts from January to December 2018. The total number of criminal incidents in Balikpapan City in 2018 was 810 crimes. The highest number of criminal acts in the 2018 period was in Damai Sub-district with a total of 63 cases, while Gunung Samarinda Baru Sub District was a sub-district with the lowest number of criminal cases, with a total 1 case.

3.4 Pulse
In this study, pulse/leisure was identified as an area usually visited by people or as a gathering place in an area (figure 4). Based on the results of the identification that has been done, there are 36 units of leisure points scattered in Balikpapan. Prapatan Sub-districts have the highest number of leisure points with a total of five units.

3.5 Potential
The identified economic facilities consist of 9 types of economic facilities; shops, minimarkets, supermarkets, malls, markets with permanent buildings, restaurants, food and beverage stalls, inns and hotels. The identified creative industries are divided into five creative industries; the woven industry, leather goods, clothing/weaving, furniture and the pottery/ceramic brick industry. Based on the results of data processing that has been done, the number of creative industries in Balikpapan is 628 industrial units (figure 5).
Figure 4. Map of leisure points distribution.

Figure 5. Map of economic facilities.

3.6 City brand index

City brand index is measured using a weighted analysis based on the classification of each variable; Presence, Place, People, Pre-requisites, Pulse, and Potential. The following is the sum of the scores on each sub-variables, which are then grouped and normalized into five variables.

| Sub variables     | Total Score | Variables | Index   |
|-------------------|-------------|-----------|---------|
| urban structure   | 12.50       | Place     | 34.56   |
| city image elements | 56.62   | Pre-requisites | 49.68 |
| health facilities | 47.12       | Potential | 22.10   |
| educational       | 50.95       |           |         |
| public transportation | 50.98 |             |         |
| ethnic group      | 64.34       | People    | 55.67   |
| security level    | 47.00       |           |         |
| leisure           | 21.18       | Pulse     | 21.18   |
| trade facilities  | 30.18       |           |         |
| creative industries | 15.52 |             |         |
| economic facilities | 20.59   |           |         |

The branding index is obtained by scoring the number of sub-variables units measured in each sub-district. Based on the calculation of the branding index score, the variable people (55.67) and pre-requisites (49.68) show the most significant influence on the branding of Balikpapan City (figure 6). Their openness and level of security measures people. It shows that Balikpapan is a city with high tolerance and openness to be known as a safe and comfortable city. The pre-requisites variable also has a high index value, measured based on the distribution of health, education and public transportation facilities that are evenly distributed in sufficient numbers. It is also supported by economic facilities and the development of the creative industry.
4. Conclusion
Based on the calculation of the branding index score, the variable people (55.67) and pre-requisites (49.68) show the most significant influence on the branding of Balikpapan City. It shows that Balikpapan is a city with high tolerance and openness and also has a high index value based on the distribution of health, education and public transportation facilities.

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