We are getting stronger as we stay longer: the influence of place attachment to urban community resilience

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Abstract. The increasing number of disasters happening in cities has put the sustainability of urban life at stake. One of the measures to strengthen the community's resilience is by understanding how they got attached to the place they live. However, the findings of the previous research regarding the influence of place attachment to community resilience show dissimilarities. This research aims to further reveal the influence of place attachment to communities' resilience in urban areas with a variety of socio-demographic and social dynamics. The study was conducted to 323 households that have frequently been affected by flood, at an urban-village, Tallo sub district, of Makassar City, Indonesia. With simple linear regression analysis, the aspects of place attachment which are personal, social, physical, and cultural are measured to assess its influence on each of their resilience perceptions. The research revealed that there is a positive influence of place attachment to a communities' resilience. Based on the communities' response, it can be seen that resilience is more likely to be formed by social-community aspects.

Keywords: Place attachment, community resilience, disaster.

1. Introduction

The number of the world population inhabiting urban areas has shown a continuous increase. The UN Population Division DESA's data shows that currently 56.2% of the world populations live in the city, and is forecasted to reach 68.4% at 2050\textsuperscript{[1]}. In line with it, the number of global disasters has also increased, putting cities and urban areas at high risk, due to the population posture, density, and economic activity that are concentrated in urban areas \textsuperscript{[2]}. The concept of city resilience is meant to reduce the risk of disasters in urban areas, and support essential systems (including the urban community) to be flexible in maintaining its function, before, during, and after the disaster.

Community resilience refers to the capacity of the social system to respond, adapt, and recover from disaster \textsuperscript{[3]}. The capacity is determined by the characteristic of a community, one of which is being attached to the place they live \textsuperscript{[4], [5]}. Emotion, cognition, and behavior reflected by
individuals or groups to a certain place, is becoming important to understand psychological factor related to disaster, including the risk perception, and environmentally related behaviors [6].

A number of empirical studies have been performed to investigate how far place attachment contributes to community resilience. These researches are implemented to communities with different sizes, and with a variety of threat potentials [7], [8]. Despite the findings of a correlation, studies cannot yet firmly conclude how place attachment influences towards a stronger or weaker resilience of the community, especially those who have socio-economic and cultural complexity like in the cities. The inconsistent findings from previous research has inspired further studies in regards to how those two constructs influence each other. This research takes the community of Tallo sub-district, of Makassar city, Indonesia, who live at the frequently flood affected area due to the geographical position (at the coastal line), as the study case. Beside the influence of place attachment to the communities’ resilience, this research also attempts to reveal the most influential factor that forms place attachment and community resilience by observing how the respondents react to the questions.

2. Literature Review

2.1. Place Attachment

The concept of place attachment in the scope of environmental-psychology refers to a bond that is formed between humans and the place they live. The word ‘attachment’ explains the aspect of affection, while place is an environmental setting where humans are attached to [9]. Attachment emerges when an individual attaches a value, or gives a meaning to a space, either personal (psychological), social, or cultural, by a process that involves feeling (emotion), cognition (knowledge), and action (behavior) [10].

The forming of place attachment is influenced by various aspects, which are personal, social, physical, and cultural. Personal aspects are connected to the socio-economic condition of the person in the community, and usually become a predictor of the presence of place attachment. One of the indicators of personal aspect which is the strongest and most consistent is the length of residence/association at a place [11]. The longer someone stays at the same place, the stronger the person builds a value towards the place [12]. The home ownership and education level is another important predictor of the personal aspect. While length of stay and ownership is a positive predictor, education level which is related to the mobility of a person is a negative predictor to place attachment [10]. The social aspect of place attachment is often linked to the community attachment. This aspect is formed as a result of meaningful interactions among individuals in that community [13]. Attachment to community arises the feeling of security equipped by community members. This aspect is even assumed more meaningful compared to satisfaction of environment-physical attributes at the community with middle-low level income [9]. A number of researches put density, community size, and home types as indicators at physical aspect of place attachment [10], [11]. However, at the type of community that lives in the middle to lower level of residential area, the condition of the houses becomes the most dominant influencing factor [9]. The cultural aspect of place attachment is formed when the place is historically connected to a particular ethnic or group. To maintain the value of a place, rituals ceremonies are held to unite the group in the community.

2.2. Community Resilience

The concept of resilience, which is initially utilized in ecology, has now been applied extensively to describe the ability of a system, not only to absorb disturbance, but also to preserve the previous condition [14]. In social science, resilience refers to the ability of an individual to respond to changes, and recover from any kind of disturbance, and be prepared to anticipate any challenging conditions in the future [4]. Community resilience focuses on the capacity possessed by a group of people that share the same place, purpose, value, and even the same destiny, to survive and adapt with any kind of threats and obstruction to their living environment.

Community resilience is formed by the interaction between internal factor (existing characteristics in a community), and the external factors that influence their ability in surviving and adapting. It
becomes the basis of the development of methods in measuring communities’ resilience by experts. Disaster Resilience of Place (DROP) measures the community’s resilience based on the exogenous factors (ecology, social, economy, infrastructure) and endogenous factors (community competence) [3]. Aharanson and Lahad developed The Conjoint Community Resilience Assessment Measure (CCRAM) that assesses the objective aspect and community resilience perception [15]. The Urban Community Resilience Assessment (UCRA), a collaboration project between World Resources Institute (WRI) and Cities Alliance has comprehensively assessed the place vulnerability, social cohesion, and individual competence in community [16]. This research aims to assess the community resilience related to place attachment, thus the assessed resilience is the one that is subjective (resilience perception). Resilience perception is used to understand affection and community cognition elements in evaluating everyone’s adaptive capability [17].

The socio-demographic aspect (age, education, and profession) are the internal factors that influence community resilience [18], in addition to the competency/characteristics that exist within the community. Local knowledge and past experience in encountering disaster, perception of disaster risk, preparedness, efficacy, and participation are the keys of community resilience [3], [16], [18], [19]. While for the external factors, social context in a community (social cohesion and leadership in a community) will ensure aid availability and support among each other member of the community crucial moments [5], [15]. The physical aspect is also an important factor that is strongly related to the perception of the safety of the neighborhood/living place towards disasters [20].

2.3. Place Attachment and Community Resilience

Place attachment is commonly used at the attempts to understand resilience to environmental changes and disasters. Attachment to places contributes to enhance the community participation to the environmental change related issues by arises the environmental preservation behaviors [21]. Place attachment is also proven to enhance the adaptive capacity of the community, especially those who are economically dependent on a place [8]. Nevertheless, a higher level of a place attachment might hinder the community’s preventive behavior to disaster risk [22], when presented with a high risk threat and high risk-perception. High risk-perception to disasters are shown by those who have high level of place attachment, but at the same time they also tend to ignore other effects that might occur [7]. This is a form of coping mechanism to handle fear of disaster risk potentials.

3. Research Methods

This research uses quantitative-deductive approach, with a survey method. The variables researched are the place attachment (independent variable), and community resilience (dependent variable).

The survey is performed using a questionnaire that consists of 18 questions, each of which is provided with answers on a scale from 1 to 4. The place attachment variable is assessed with 8 indicators, which are rootedness, social bonds, social interaction, home quality, sense of security, environment responsible behavior, cultural characteristics, and cultural similarity. Whilst the community resilience variable is assessed with 9 indicators which are the social cohesion, leadership within the community, perception of home safety, disaster experience, disaster risk perception, preparedness, planning, efficacy, and participation.

Tallo sub district, which is located at northern part of Makassar City, Indonesia, was selected as location of study, focused at four neighborhoods (RW A, B, C, and D) that are frequently affected by flood due to its geographical position at the coastal line. Tallo sub district is categorized as a flood-affected zone with a surface area of 51,431sqm, and flood level reaching 50cm [23]. The social life of community at Tallo sub-district reflects a village characteristic even though it administratively located at urban area.

Data were collected from 323 respondents, assisted by 3 enumerators. The questionnaires were not self-administered due to the low level of community’s literacy and education. Instead, they were asked directly to the respondents. The age of respondents in this research was selected to at least 20 years old, and only one respondent at each of household was chosen as representative. The data was
collected at daytime to evening for five consecutive days. Other than questionnaires, observation was also conducted to get the overall picture of the settlement’s condition objectively. The observation focused on the community’s behavior in adapt to disaster risk regarding their settlement, and the government’s intervention as a mitigation action to flooding event in this neighborhood as well.

Data analysis was conducted with simple linear regression analysis, assisted by the SPSS version 22 application. This kind of analysis is commonly used in studies that aim to discover the influence between 1 independent variable and 1 dependent variable [24]. It requires two classical assumption tests to be performed as condition before the analysis is run, which are (1) Data validity and reliability test, and (2) Data normality and linearity test. Validity test was conducted using The Pearson product-moment correlation analysis, where the correlation coefficient value, r_{\text{count}}, should greater than r_{\text{table}}’s value. Whilst the reliability test requires Cronbach’s alpha greater than 0.600. Kolmogorov-smirnov test is used for the normality test, with the requirement of the residual value more than 0.05. The same applies for the data linearity test; the value of the sig.deviation accepted is more than 0.05. The results for Pearson’s correlation showed that coefficient value of r_{\text{count}} at both variables were greater than r_{\text{table}}’s. The Cronbach’s alpha for place attachment variable was at 0.785, while for community resilience was at 0.655. Those results indicate that the instrument used for this study has met the condition for validity and reliability tests. The Kolmogorov-smirnov test came with residual value at 0.08. Sig.dev value from linearity test was at 0.06. Both were greater than 0.05, which means that the data used in this study is normally distributes and has linearity.

4. Results and Discussions

4.1. Respondent’s Response Frequency

Respondents at the research location are dominated by women (53.6%) with the dominant range of age (63.47%) at 30-49 years old. Averagely, the education level of the head of the household is Elementary School (32.8%), and Senior High School or higher (35%), where 52.3% are working in the informal sector as casual laborers. Most of the respondents (57.9%) have been staying at this place for more than 15 years, and holding ownership status of house and land (94.7%). The average value of household’s dependency ratio is at the range of less than 46%.

Determining the average value of respondents’ answers of each question in the questionnaires is intended to understand the respondents’ response to each of the variables [24]. By doing so, it can be comprehended which of the indicators of the variables gains the highest or the lowest scores, thus the overall picture of the variable-related condition/phenomenon of the study can be discovered. On the place attachment variable, the respondents mostly gave the highest scores (3.8 out of 4) at the question of “Do you know the people in this neighborhood well?” which is the indicator of social bond. This condition is in-line with the theory that, social aspect (community attachment) has predominantly influenced place attachment compared to satisfaction towards place’s physical attributes (community satisfaction) in community with middle-low level of income. The social bonds of the community residing in Tallo sub-district are merely formed because of the intensive interaction within the community, either by formal events (social organizations/activities), and also non-formal gatherings (to get together just to mingle and have light conversation). While the lowest score (2.04 out of 4) comes from the question of “Do you have religious celebration/cultural rituals held on a regular basis in this neighborhood?” which indicates a common cultural value. This shows the cultural aspect has not become the important factor of forming place attachment of the community in Tallo sub-district. The scores of the respondents' responses at place attachment variable are provided at the following figure 1.
The respondents showed highest agreement (score 3.43 out of 4) to the question of the social cohesion indicator, which is “Do you reach out to your neighbors when you are in need of assistance (i.e. accident, grief)?”. This is in-line with the research conducted by Patel & Gleason [25] which found out that a high score of social cohesion in the society at a slum area in Haiti, was correlated with the strong resilience of that community in dealing with disaster. The social cohesion in a community ensures the availability of aid and assistance when required during hurdle/emergency times [16]. The lowest score given by the respondents is at the question “Do you have enough savings and/or (any kind of) insurance to back up your state of emergency?”. This question originated from the indicator of preparedness which is one of the aspects in community competence. Community in Tallo sub-district that is frequently affected by flood mostly do not have long term planning regarding mitigation action towards flood disaster in financial terms, which is merely caused by their economic condition with low income at most of the households, and overall low community literacy as an addition. The scores of the respondents' responses at community resilience variable are provided at the following figure 2.
It is found out from the simple regression analysis that the significance value (Sig.) is 0.000, lower than the probability score 0.05. The t count of the regression also shows value of 9.678, greater than the t table’s value of 7.79. Based on those findings it can be concluded that the place attachment variable can be used to predict community resilience variable. The correlation score between place attachment variable and community resilience is 0.475. While the determination coefficient scores (R Square) is at 0.226. This shows that the place attachment variable has influencing factors to community resilience at 22.6%, while another 77.4% is influenced by other factors. The SPSS output of coefficient can be seen at table 1.

**Table 1. SPSS output for simple linear regression analysis.**

| Model | Unstandardized Coefficients | Standardized Coefficients | t | Sig. |
|-------|---------------------------|---------------------------|---|-----|
|       | B | Std. Error | Beta |       |     |
| 1     | (Constant) | 11.75 | 1,427 | 8,233 | .000 |
| Place Attachment | .485 | .050 | .475 | 9.678 | .000 |

a. Dependent Variable: Community Resilience

The equation of the regression is as follows:

\[ Y = 11.75 + 0.485X \quad (1) \]

The constant value of 11.75 shows that the community resilience variable’s consistency level is at 11.75. The X regression coefficient of 0.485 indicates that for each 1% increase in place attachment level, community resilience grows stronger 0.485. Since the regression coefficient shows positive value, the direction of the place attachment variable to community resilience is positive.

The findings in this research confirm the theory which claims that place attachment is a catalyst that can strengthen the community’s resilience [8], [26. In the particular location of this research, the strong attachment to the place has encouraged the local community to carry out adaptive behaviors by reinforcing their building structure which was initially made of wood, gradually being replaced or being added with brick structure. A strong social cohesion within the community of Tallo sub-district facilitates and enables that movement to be self-subsistent. This is in line with theory states that resilience in a community with rural characteristic is likely to emerge due to the high social context amongst the community members [27]. Nevertheless, the ability of place attachment variable to predict the community resilience is considerably small. The lack of government involvement and other related parties in the activities of disaster risk mitigation actions in Tallo sub-district is the cause of the low level of the community’s knowledge on the importance to have long-term planning related to disasters. Revitalization of the environment by the government is limited only to the improvement of roads and supply of clean water piping network from PDAM, which unfortunately often does not work, thus makes no point for the people.

5. Conclusions
In conclusion, built upon the feedback of the respondents at Tallo sub-district of Makassar City, Indonesia, place attachment and community resilience are mostly emerged by social aspects (social bond and social cohesion). Not only increase their attachment to the place they live, the existence of social context within a community can also ensure the availability of support when needed, which eventually also strengthens the community’s resilience collectively. Place attachment gives positive influence to the attempt of strengthening the community’s resilience. At Tallo sub-district, the communities carry-out self-subsistent mitigation movements as part of their behavior of protecting their meaningful living place.
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