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A community resilience model to understanding Marunda Rusunawa offenders post flood relocation in DKI Jakarta

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Abstract

Jakarta faces settlement problems where there are residents who live in riverbank areas. This problem makes residents vulnerable to flooding during the rainy season along the Ciliwung River and tidal floods in the North Jakarta area. Facing this, the DKI Jakarta government relocated residents who were flood victims to Marunda Rusunawa. Several problems related to the relocation policy need to be considered, such as the difference in the community's perspective on it, which causes residents to reject it. This study aims to analyze the community resilience model to understand the residents of Marunda Rusunawa post-flood relocation in DKI Jakarta. The research used stratified random sampling and analysis using the Structural Equation Modeling (SEM) technique based on Partial Least Square (PLS). The analysis results show that the ecological aspect is the most dominant in shaping the resilience of the resident community, followed by cultural, social, economic, physical, and technological aspects. The political and human resource aspects are not aspects that form community resilience.

Keywords: Community Resilience; Relocation; Flood; Structural Equation Modeling (SEM)

1. Introduction

The use of river banks for residents' settlements is the cause of reduced water catchment areas. The reduced area of riverbanks and reduced water catchment areas is ultimately unable to hold back the rate and river water discharge overflows to the surface (Safrudin, 2014). In addition, tidal floods have caused flooding in the North Jakarta area. North Jakarta, which is directly facing sea water, has the potential for tidal flooding. North Jakarta, which is directly facing sea water, has the potential for tidal flooding. The uncontrolled use of groundwater causes land subsidence, and the rapid development in the northern area of Jakarta creates the potential for tidal flooding (Hadi, 2017).

North Jakarta is one of the areas in Indonesia that directly faces sea water, so it has the potential for tidal floods to occur. The uncontrolled use of groundwater is one of the leading causes of land subsidence in the North Jakarta area. In addition, the rapid development in the North Jakarta area is one of the reasons for the rapid rate of land subsidence in the North Jakarta coastal area. In dealing with these problems, the DKI Jakarta government considers that the Ciliwung River often causes flooding due to overflowing river water discharge. The downstream part of the Ciliwungriver has narrowed the river's flow, caused of a large number of illegal housing on the banks of the Ciliwung river (Fitrianti, 2018). Therefore, the DKI Jakarta government relocated residents who were in the areas along the Ciliwungriver affected or became victims of flooding during the rainy season and tidal floods. Several areas have not been affected by flooding. However, they have the potential to eventually move to Rusunawa, provided by the DKI Jakarta government, one of which is RusunawaMarunda, North Jakarta. Referring to conditions in other locations, a positive factor after the flood incident on January 15, 2014, in Manado was stimulating the development of sparsely populated areas by opening residential areas, especially in the Mapanget sub-district (Runtunuwu et. al, 2020).

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The construction of flats aims to maintain the unity of the village community of origin, and the priority for development is in a location above the former slum village. The main target is the residents of the slum village itself, most of whom are middle-low income earners. It also aimed to meet the need for settlements by utilizing limited land, so the government made a policy to build flats as stipulated in Law Number 16 of 1985 concerning flats. Several problems need a solution related to the relocation policy, such as the difference in the public's perspective on the relocation policy. After being relocated to simple flats, residents needed to adjust to several aspects of life in the new environment. Berkes et al. (2003) explain that resilience is a process of learning to live in change and uncertainty, maintaining diversity for reorganization and renewal, combining various knowledge, and creating opportunities for self-organization.

Initially, residents refused to move to Marunda's simple flats. The refusal was because moving residence would eliminate livelihoods (traders/entrepreneurs) and lose houses cultivated for years. Besides that, the distance to the place of activity is far, and changes in the environment where they live, neighbors, and changes in the livelihood system, require residents to adapt to a new environment. Psychologically, this condition makes residents uncomfortable.

Based on this, this research is interested in exploring community resilience in terms of physical factors and taking into account various aspects, namely economic, social, cultural, ecological, human resource, technological, political and governance aspects.

2. Literature Review

2.1. Community resilience

As complex and system-dependent human creations, cities are highly vulnerable to the threat of natural disasters. Cities' points of vulnerability are in infrastructure systems, buildings for telecommunication, transportation, energy, and supply network sources. This system includes security officers, firefighters, planners, building inspectors, health services, families, schools, and the media.

Godschalk (2003), in Urban Hazard Mitigation: Creating Resilient Cities, proposes a sustainable mitigation policy system to build community resilience capable of managing extreme events. This resilience is essential, considering disasters and terrorism are unpredictable events. Also, resilient cities show few collapsed buildings, less frequent power outages, and fewer injuries and deaths. Apart from affecting physically, the disaster will also affect the social and economic aspects of the city. There is a need to discuss a new way of understanding complex mitigation and adaptive modeling systems, identifying the need for city resilience as a metasystem vulnerable to disaster threats and terrorism. Disaster mitigation includes actions to avoid, reduce or eliminate the long-term risks from natural and technological hazards to people's lives and property. Mitigation planning also estimates vulnerability to hazards and takes anticipatory actions to reduce risk and exposure.

Society is a group of people with the same traditions, habits, and feelings of unity. It refers to people who identify with specific areas, knows themselves, and adhere to values and interests needed to achieve balance and satisfying living conditions (Syani, 1995). Community and Regional Resilience Institute, CARRI (2013) defines community resilience as the ability to anticipate risks, limit impacts, and bounce back quickly through survival, adaptation, evolution, and growth in the face of turbulent changes. A core concept of community resilience consists of 5 basic concepts: attribute, continuing, adaptation, trajectory, and comparability.

Blakeley (2016) put forward the approach used by New Zealand in the updated National Disaster Resilience Strategy using six aspects of community resilience which include: social resilience, economic resilience, infrastructure resilience, environmental resilience, cultural capital, and governance, where these six aspects come from the initiation of stakeholders from various levels. The concept of the Barrow Cadbury Trust (2012), an independent organization that cares for marginalized communities in the United Kingdom, explains the resources that can form a resilient community through several approaches that are almost the same as the concepts above. The research refers to social phenomena, and society is considered vulnerable to economic changes such as recession, population, and residents' emotional attachment to where they live. Schwind (2009) emphasizes that a resilient community is one in which all human rights are fulfilled regarding food, housing, education, health, social services, and employment opportunities. Besides that, Kiefer et al. (2008) realized that using technology in community resilience is challenging, considering the residents' activities and their proximity to ICT. There are several proposed requirements in understanding the level of technology use for community resilience, including availability (knowing the availability of ICT), affordability (knowing ICT affordability), accessibility (knowing ICT accessibility), and acceptability (knowing acceptance of ICT use) in measuring community resilience. Based on this description, this study then carried out several combinations of the aspects that

make up the community resilience model consisting of economic, social, cultural, ecological, physical, human resource, technological, and other political and governmental aspects.

3. Methodology

The approach used in this study is a quantitative approach that emphasizes quantitative data collection. The data collection method uses a questionnaire to the head of the family or housewife who occupies a simple rented flat in Marunda.

The population in this study were residents of simple flats for rent in Marunda, North Jakarta. The criteria set in the population collection are the head of the household or the housewife in Marunda Rusunawa residents of flood relocations.

Sampling used stratified random sampling, a sampling method by dividing the population based on the strata of the location of the apartment unit (location of the floor of the residential unit) in each block of 89 people.

3.1. Analysis Techniques

The analysis technique used in this research is Structural Equation Modeling, which allows the researcher to observe the overall relationship between the indicators and the variables and the relationship between them. SEM is a multivariate analysis technique that combines aspects of factor analysis and multiple regression analysis to enable researchers to examine a series of dependent relationships between measured variables and latent constructs (Hair et al., 2010). Completing the Structural Equation Model using the Partial Least Square computer program (Smart PLS 3.0 Program). The model analyzed in this study is a multilevel model. This research uses 2 (two) kinds of analysis techniques, namely Confirmatory Factor Analysis (CFA) and Regression Weight (Wijayanto, 2008).

4. Research Results

4.1. Outer Model Evaluation

The results of the measurement model (outer model) in the initial test of this eviction model were carried out with a significance level of 5%, with the results of several aspects and indicators from invalid and unreliable aspects as shown in Figure 1 below

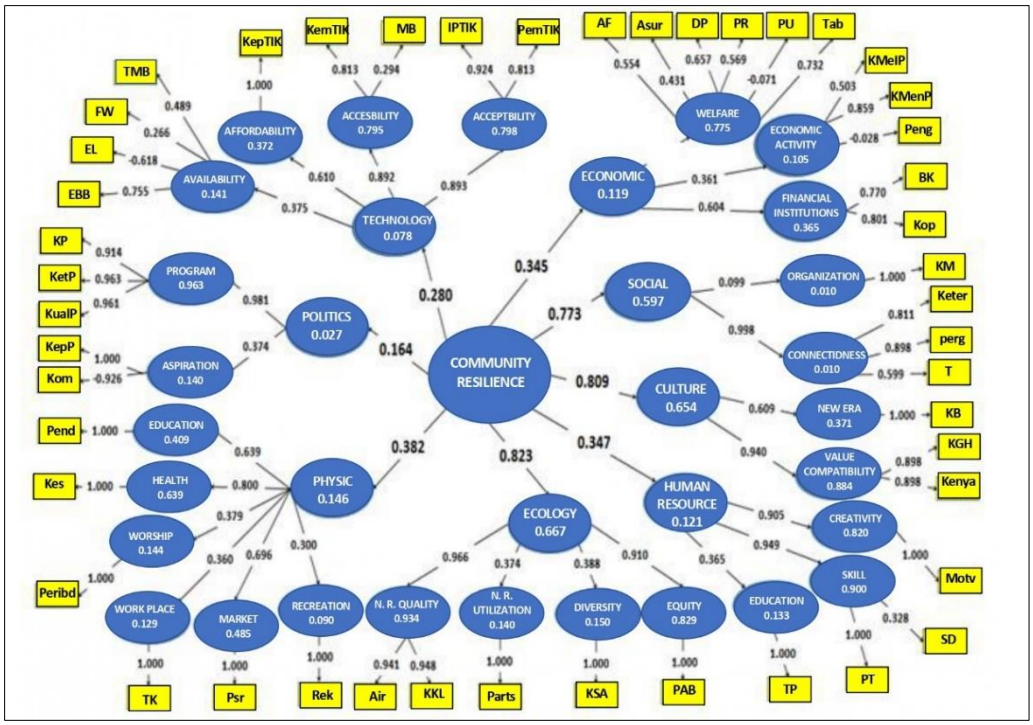

Figure 1 Initial path coefficients of the community resilience model

Based on the results of the initial evaluation of the measurement model (Outer model), it can be seen that some are invalid and unreliable, such as economic aspects, social aspects, HR aspects, physical aspects, and technological aspects. Meanwhile, the cultural and political aspects are valid but unreliable, and only the ecological aspects are valid and reliable.

4.2. Evaluation of the Inner Model

After analyzing the measurement model (outer model), they then analyze the structural model (inner model) in the initial test of the flood model. This test was carried out with a significance level of 5%. The results of the initial evaluation of the structural model (Inner model) of the community resilience model for flood relocation RusunawaMarunda residents show that the economic aspects, HR aspects, physical aspects, political aspects, and technological aspects are in the weak category. While social aspects, cultural aspects, and ecological aspects are in the moderate category.

Goodness of Fit (GoF) is used to evaluate measurement models and structural models and, in addition, provides a simple measure of the overall predictability of the model. Based on the calculations, it shows that the GoF value obtained is 0.554.

Furthermore, hypothesis testing using PLS in the Path Coefficients section is shown in Table 1 below.

Table 1 Initial Path Coefficient of the community resilience model of MarundaRusunawa residents after flood relocation

Variable	Original Sample (O)	t- Statistics	H_0	Conclusion
Economical Aspect of Community Resilience	0.345	1.121	Accepted	Not Significant
Social Aspect of Community Resilience	0.773	2.790	Rejected	Significant
Cultural Aspect of Community Resilience	0.809	3.028	Rejected	Significant
HRD Aspect of Community Resilience	0.347	1.061	Accepted	Not Significant
Ecological Aspect of Community Resilience	0.823	2.422	Rejected	Significant
Physical Aspect of Community Resilience	0.382	1.372	Accepted	Not Significant
Political Aspect of Community Resilience	0.164	0.514	Accepted	Not Significant
Technological Aspect of Community Resilience	0.280	0.949	Accepted	Not Significant

Next, several other models were tested until they met all the criteria for conformity between the model and the research data. They modified the model by removing invalid indicators and dimensions that do not significantly affect community resilience, namely Human Resources Aspects and Political Aspects. The following are the results of the final structural hypothesis testing.

The analysis results show that the most dominant aspects forms community resilience is the Ecological Aspect, r-square of 0.705 or 70.5%, followed by the Cultural Aspect, r-square of 0.674 or 67.4%; the Social Aspect, r-square of 0.603 or 60.3%; Economical Aspect, r-square of 0.143 or 14.3%; Physical aspect, r-square of 0.133 or 13.3%; and Technological aspect, r-square of 0.068 or 6.8% respectively.

Goodness of Fit (GoF) is used to evaluate measurement models and structural models and, in addition, provides a simple measure of the overall predictability of the model. Based on the calculations, it is known that the GoF value obtained is 0.566, and it is included in the large category.

The results of testing the hypothesis by looking at the PLS processed results in the path coefficient section show that the Economic Aspect significantly affects Community Resilience. This is because the t statistical value is more significant than 1.96 or 5,167 > 1.96. The Social Aspect has a significant effect on Community Resilience. This is because the t statistic value is more significant than 1.96 or 17,803 > 1.96. The cultural aspect has a significant effect on community resilience, and this is because the t statistical value is more significant than 1.96 or 24,243 > 1.96. The ecological aspect significantly affects community resilience because the t statistical value is more significant than 1.96 or 21,013 > 1.96. The physical aspect significantly affects community resilience, where the t statistical value is more significant than 1.96 or 4,888 > 1.96. The Technology Aspect has a significant effect on Community Resilience; this is because the t statistic value is more significant than 1.96 or 3,934 > 1.96

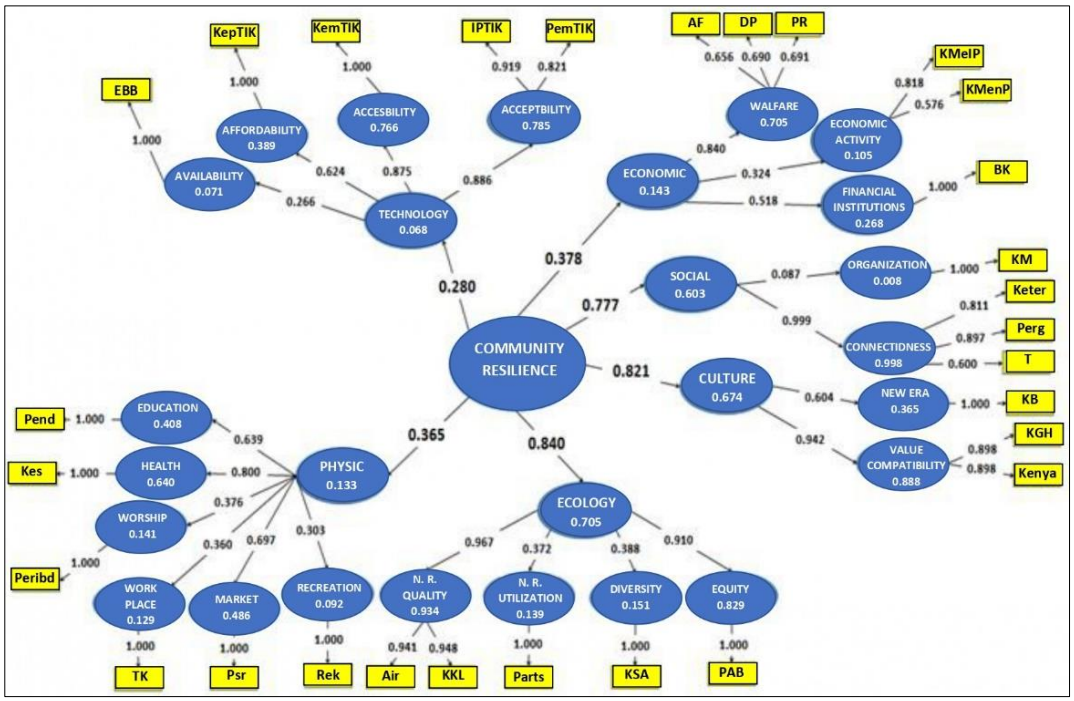

Figure 1 The final path coefficient of the resilience model of the MarundaRusunawa resident community for flood relocation

5. Discussion

Based on the results of the analysis shows that the ecological aspect is the most dominant in shaping the resilience of the community of MarundaRusunawa residents who were relocated due to flooding by 70.5%. The cultural aspects (67.4%), social aspects (60.3%), economic aspects (14.3%), physical aspects (13.3%), and technological aspects of 6.8%. Thus, in the flood relocation model, six aspects form community resilience.

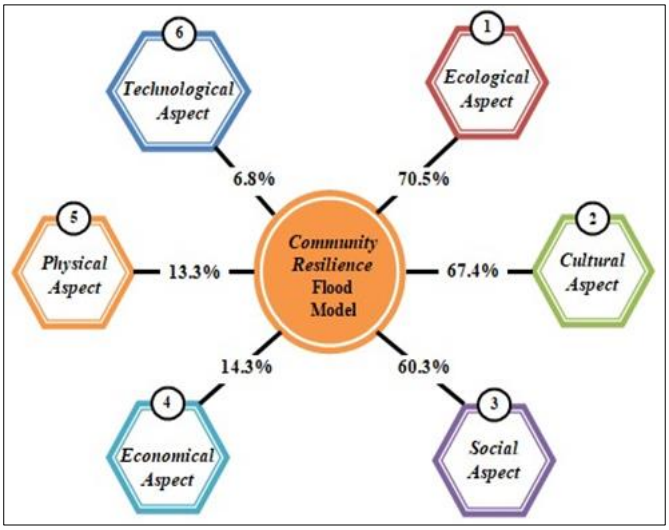

Figure 2 The aspect that dominates the resilience of the community in the residents of the MarundaRusunawa relocation is the Flood.

Based on the models proposed by several previous studies, the flood relocation model has the same background characteristics: vulnerability to disasters that cause unpleasant events. However, in the Longstaff (2010) model, Atreya&Kunreuther (2016), Blakeley (2016), Barrow Cadbury Trust (2012), and British Red Cross (2013), no one uses

technological aspects as one of the essential aspects that shape community resilience. In the flood relocation model, the technological aspect is considered one of the essential aspects in building resilience when the respondent group can take advantage of information technology, such as buying and selling through online shops, as well as technology, such as Go-Jek and Grab. Therefore the group of respondents felt empowered again after going through unpleasant events (floods and relocation to flats).

On the ecological aspect, indicators of natural resources quality, equity, diversity, and utilization of natural resources sequentially dominate the formation of ecological aspects. For residents of flats, whom the Provincial Government of DKI Jakarta relocated because the previous location was prone to flooding, good quality clean water and smooth disposal of household wastewater and waste are the main forming factors in natural resource quality indicators.

In the cultural aspect, indicators of value conformity and comfort dominate more in shaping cultural aspects than indicators of new habits. The suitability for values and comfort indicators reflect that living in flats is appropriate for residents because they can still carry out social activities with neighbors and live comfortably. While waiting for a job or starting a new business activity, residents use their spare time to get involved in various social activities, fishing, sports, or other activities that make residents more relaxed and comfortable.

The location of the apartment unit's residence is determined by lottery by UPRS Marunda. Residents relocating due to flooding are randomly assigned to clusters A and C. In terms of connectedness, most residents feel they have community leaders in their environment because they are considered able to represent the community, are responsible and are wise in understanding the problems faced by residents. In addition, some residents feel comfortable associating with neighbors because many neighbors are open and actively involved in social activities.

After moving to the flats, the residents lost their physical assets, and the average income decreased. At the same time, the duration of work increased because respondents continued to work as casual laborers in their original location (Penjaringan fish market). Barrow Cadbury Trust (2012) explains that community resilience can be formed through the availability of financial resources for business development and entrepreneurship. Financial institutions, especially commercial banks, are expected to be the primary source of capital in starting a business because most residents work as traders in their place of origin. However, because the physical assets owned by the respondents were inadequate as loan guarantors, they found it challenging to access capital from commercial banks. The economic activities of the flood relocation residents in the flats are trading groceries and culinary/food items like in the area where they lived before. However, it is felt that this has not been able to improve welfare because the purchasing power of the residents of the Marunda flats is lower compared to the last place of business.

Flood relocation respondents can take advantage of technological aspects to increase their community's resilience through knowledge of buying and selling online and using their smartphone. The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP, 2016) states that Information and Communication Technology (ICT) has an essential role because ICT has become an integrated part of almost every aspect of life.

6. Conclusion

The study aimed to analyze the resilience model of the Marunda Rusunawa resident community after being relocated due to flooding. Based on the analysis and discussion results, the resilience model for the community of Marunda Rusunawa residents after the flood relocation is formed of six aspects. The ecological aspect is the most dominant in shaping the resilience of the resident community, followed by cultural, social, economic, physical, and technological aspects. The political and human resource aspects are not aspects that form community resilience.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest.

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