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An Analysis of the Knowledge of Disaster Preparedness and Occupational Health and Safety (OHS) Promotion on Earthquake Disaster Preparedness

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Indonesia is a country that often experiences natural disasters; earthquakes often occur in in Indonesia. Brawijaya University is located in Malang City, which is often shaken by shallow scale earthquakes. The purpose of this study was to assess the relationship between Brawijaya University students' knowledge about disaster preparedness and OHS promotion on earthquake disasters preparedness. Data collection techniques used in this study were observation and distribution of questionnaires. Data analysis was done through the Partial Least Square (PLS) method to determine the level of knowledge of disaster preparedness and OHS promotion on earthquake disaster preparedness. The results of this research are that knowledge of disaster preparedness and OHS promotion have an impact on the earthquake disaster preparedness. Higher knowledge of disaster preparedness and OHS promotion will increase earthquake disaster preparedness. This study recommends the promotion of earthquake disaster socialization for students of Brawijaya University, and promotion about OHS which contains OHS training and specific counselling on earthquake disaster preparedness.

Key words: *Earthquake, Knowledge, Preparedness, Occupational health and safety (OHS), Partial Least Square (PLS).*

Introduction

Indonesia is a country that often experiences natural disasters. Earthquakes often occur in Indonesia, and they range small scale to potentially causing a tsunami.

The number of earthquakes is seen to increase during 2015 to 2018. The death toll from earthquakes experienced a significant decrease from 2016 to 2017. Meanwhile, the number of injuries arising from earthquakes significantly increased from 2017 to 2018. The number of people who were displaced increased every year except from 2016 to 2017, in this time period there was a significant decrease.

Brawijaya University is a well-known state university in Indonesia. They are located in Malang City, which is often shaken by shallow-scale earthquakes. The Head of the Climatology and Geophysics Meteorology Agency (BMKG), Karangkates Geophysics Station, stated that Malang was the closest area to the meeting point between the Indo-Australian plate and the Eurasian plate. Earthquakes in Malang are caused by the accumulation of stored energy occurring due to the shifting of the two tectonic plates. The Indo-Australian plate shifts and collides with the Eurasian plate, then one of the plates is broken; this fracture is called an earthquake. To reduce the impact of an earthquake disasters, earthquake disaster preparedness training should be conducted to provide insight on Brawijaya University students' preparedness for earthquake disasters.

Based on questionnaire data that was been distributed to students of Brawijaya University, it is seen that 61 out of 100 students have never attended earthquake disaster preparedness training or training on occupational health and safety (OHS). This shows the lack of knowledge of earthquake preparedness and the lack of promotion of occupational health and safety (OHS) as so many students still do not know what attitudes or action should be taken when an earthquake occurs.

From the explanation above, this article concerns an analysis of the knowledge of disaster preparedness and occupational health and safety (OHS) on earthquake disaster preparedness.

Literature Review

Knowledge

Knowledge is the result of knowing that occurs after people have sensed certain objects. Sensing occurs through the human senses, namely the senses of sight, hearing, smell, taste, and touch. Knowledge is mostly obtained from the eyes and ears. Knowledge is a guideline in shaping one's actions (Notoatmodjo, 2012: 138).

Earthquakes

As a country existing on the meeting points of many tectonic plates, Indonesia will often experience earthquake events. Earthquake shocks occur due to the movement, shear, or fracture of rock layers in the earth (Ministry of Communication and Information, 2008: 7).

Disaster Preparedness

To reduce the impact of disasters, disaster preparedness can be done. According to Law No. 24 / 2007 concerning disaster management, preparedness is a series of activities carried out to anticipate disasters through organizing appropriate and efficient steps.

Occupational Safety and Health (OHS)

According to the Decree of the Minister of Manpower R.I No. Kep. 463 / MEN / 1993, occupational safety and health are protective measures aimed at ensuring that workers and other people in the workplace are safe and sound, so that ultimately, every source of production can be used safely and efficiently.

Structural Equation Modeling with Partial Least Square (SEM-PLS)

SEM with PLS is an alternative technique in SEM analysis where the data used does not have to be multivariate in a normal distribution. In SEM with PLS, the value of latent variables can be estimated in accordance with the linear combination of manifest variables associated with a latent variable and treated to replace the manifest variable.

Research Methods

Data was collected through the distribution of questionnaires to students of Brawijaya University. The questionnaires contain a list of questions to obtain data and information from respondents. The questionnaires use a 5-point Likert scale to obtain responses.

Identification of Variables

The variables in this research are knowledge about earthquake (P), occupational safety and health (K), and preparedness for earthquake disaster (S). Research hypothesis testing, namely:

1. Effect of knowledge about earthquake (P) on earthquake preparedness (S).
2. The effect of occupational safety and health (K) on earthquake preparedness (S).

Table 3.1: Variables in the model

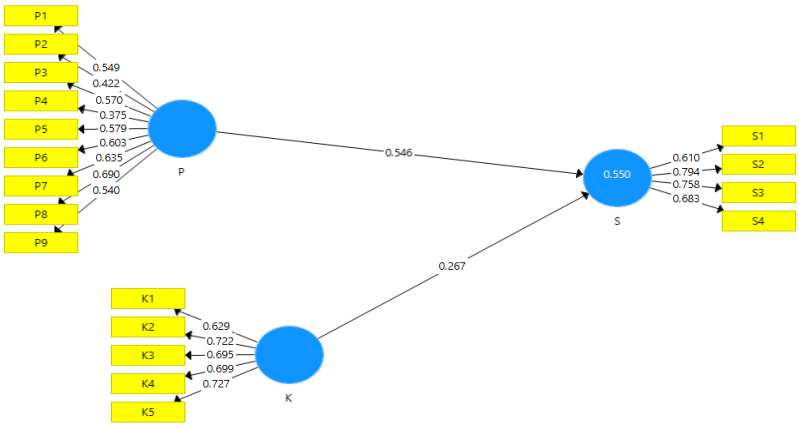
Variable	Indicator	Information
P	P1	The cause of earthquakes is shifting tectonic plates
	P2	The cause of earthquakes is volcanic eruption
	P3	Action - When an earthquake happens and you are inside a house, take shelter in a safe place (for example under a sturdy table)
	P4	Action - When an earthquake occurs and you are indoors, head to the open field immediately
	P5	Action - When there is an earthquake and you are inside the house, stay away from objects that are hanging
	P6	Action - When there is an earthquake and you are inside the house, stay away from windows / glass walls
	P7	Action - When an earthquake happens and you are inside a house, you are to rush to evacuate / to an evacuation site
	P8	Action - When there is an earthquake and you are inside the house, you are to calm down / not panic
	P9	Action - When an earthquake occurs and you are driving a vehicle, you are to stop driving
K	K1	K3 is a multi-disciplinary science that implements efforts to maintain and improve working environment conditions, work safety and protect workers from all hazards and risks
	K2	K3 is the knowledge used to prevent the loss of costs incurred when a work accident occurs
	K3	With the application of K3, it can increase preparedness against earthquake disasters
	K4	K3 counselling can increase preparedness against earthquake disasters
	K5	Specific education is important to support earthquake disaster preparedness
S	S1	Preparedness is a series of activities carried out to prepare themselves for disasters

	S2	Equipment that needs to be prepared when an earthquake occurs is a map and a path to rescue points
	S3	Equipment that needs to be prepared during an earthquake is equipment and equipment for rescue
	S4	Equipment that needs to be prepared when an earthquake occurs is a first aid kit, a tent and essential medicines

Results

The following are the results of data processing with 100 respondents using smartPLS

Picture 4.1. Path diagram model with smartPLS



Interpretation of Smart PLS Test Results

1. Discriminant Validity

Cross loading aims to assess whether the construct has adequate discriminant validity by comparing the relationship between indicator variables with the correlation of these indicators with other variables. Discriminant validity can be tested by looking at the cross loading table, this output is used to test the discriminant validity at the indicator level with the provisions. The correlation between the indicator with its latency variable is compared with the correlation between the indicator with other latent variables (outside the block). More details can be seen in Table 4.1 below:

Table 4.1: Cross Loading

Indicator	K	P	S	Ket
K1	0,629	0,431	0.365	Valid
K2	0,722	0,539	0,559	Valid
K3	0,695	0,276	0,365	Valid
K4	0,699	0,315	0,307	Valid

K5	0,727	0,508	0,422	Valid
P1	0,425	0,549	0,426	Valid
P2	0,350	0,422	0,205	Valid
P3	0,374	0,570	0,446	Valid
P4	0,325	0,375	0,248	Valid
P5	0,239	0,579	0,345	Valid
P6	0,267	0,603	0,378	Valid
P7	0,254	0,635	0,430	Valid
P8	0,457	0,690	0,488	Valid
P9	0,415	0,540	0,477	Valid
S1	0,366	0,472	0,610	Valid
S2	0,498	0,564	0,794	Valid
S3	0,439	0,521	0,758	Valid
S4	0,414	0,469	0,683	Valid

2. Composite Reliability

Reliability testing is performed via composite reliability. In testing the reliability of the construct using composite reliability, the value must be >0.7 for confirmatory research and between 0.6 and 0.7 for explanatory research.

Table 4.2: Composite Reliability

Variable	Composite Reliability
P	0,799
K	0,823
S	0,805

The table above shows that all constructs have composite reliability values above 0.7; therefore the model used is reliable.

Inner Model Test Results

Testing of the inner model or structural model is conducted to see the relationship between variables, significance values and the R-square of the research model. After realising the significant relationship between the variables, a hypothesis can be concluded.

Table 4.3: R-square

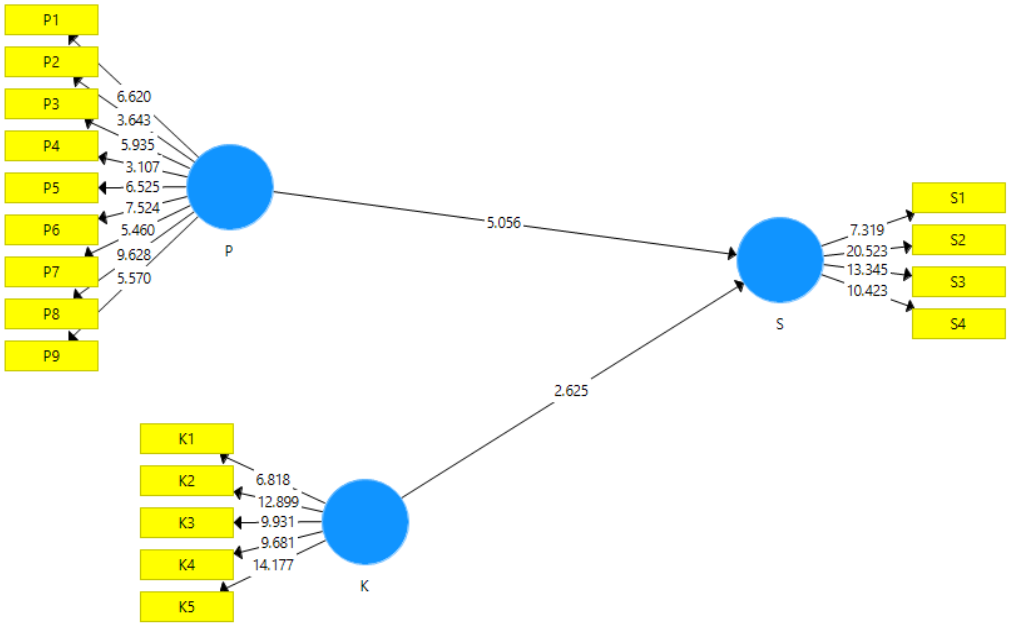
Variable	R Square	R Square Adjusted
S	0,550	0,541

Table 4.3 shows that the R-square value is 0.550, which provides that the P and K variables contribute 55%, which means that there is a significant relationship between the variables.

Hypothesis Test Results

Testing hypotheses in PLS can be done by using the statistical t-value compared with the t-table value. The T-table value with a significance of 5 percent and degree of freedom (DF) is equal to the amount of data (n) – 2, that is 100 - 2 = 98, i.e 1,984 (t table) will be displayed below. Picture 4.2 shows the results of the path hypothesis:

Picture 4.2. Outer Model



Based on the figure above, the t-statistic value of disaster preparedness knowledge (P) on earthquake preparedness (S) is 5.056>t table 1.984. This shows that the influence of disaster preparedness knowledge (P) is significant on earthquake preparedness (S). The t-statistic value of the influence of occupational health and safety (K) on earthquake preparedness is 2.635> t table 1.984, this shows the significant effect of occupational health and safety (K) on earthquake preparedness.

Conclusion

Based on the results of the data analysis and discussion with the Partial Least Square (PLS) method, the following outcomes can be summarily put:

1. Based on the evaluation results of the measurement model, 18 indicators are valid in measuring each latent variable. These can be used to form variables that affect the readiness of Brawijaya University students in facing an earthquake disaster.
2. Based on the results of hypothesis testing, knowledge variables about earthquakes and occupational health and safety have a positive and significant impact on preparedness in the face of earthquake disasters.

Suggestions

1. Provide knowledge to Brawijaya University students about earthquake preparedness by conducting counselling and earthquake simulations
2. Provide specific counselling about K3 to increase knowledge about disaster earthquake preparedness.

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