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The Influence of Indonesian Marine Corps Readiness on Disaster Relief Effectiveness in Supporting Joint Operations

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Abstrak

Studi ini menyelidiki efektivitas manajemen bencana oleh Korps Marinir Indonesia, dengan menekankan kerentanan Indonesia terhadap bencana alam seperti banjir, gempa bumi, dan tsunami, yang menempatkan negara ini pada peringkat ke-37 dalam Indeks Risiko Dunia 2019. Penelitian ini mengidentifikasi tantangan utama, termasuk koordinasi yang tidak memadai dengan para pemangku kepentingan manajemen bencana, kesiapan peralatan yang tidak memadai, dan kurangnya sumber daya manusia yang sangat terlatih, yang semuanya menghambat respons bencana yang efektif. Dengan menggunakan pendekatan kuantitatif, studi ini mengevaluasi dampak kesiapan komunikasi, kesiapan peralatan, dan kesiapan sumber daya manusia terhadap efektivitas manajemen bencana, menggunakan data yang dikumpulkan melalui kuesioner dan dianalisis dengan perangkat lunak SPSS. Temuan tersebut mengungkapkan bahwa faktor-faktor ini secara kolektif berkontribusi terhadap 70,3% efektivitas dalam operasi tanggap bencana, yang menyoroti kebutuhan kritis untuk meningkatkan koordinasi, meningkatkan peralatan, dan pelatihan yang lebih komprehensif untuk memperkuat kemampuan manajemen bencana Korps Marinir.

Kata Kunci: *Kesiapan Korps Marinir, Operasi Gabungan, Manajemen Bencana, Sumber Daya Manusia*

Abstract

This study investigates the effectiveness of disaster management by the Indonesian Marine Corps, emphasizing Indonesia's susceptibility to natural disasters such as floods, earthquakes, and tsunamis, which places the country 37th on the 2019 World Risk Index. The research identifies key challenges, including inadequate coordination with disaster management stakeholders, insufficient preparedness of equipment, and a lack of adequately trained human resources, all of which impede effective disaster response. Employing a quantitative approach, the study evaluates the impact of communication readiness, equipment readiness, and human resource preparedness on the effectiveness of disaster management, using data collected through questionnaires and analyzed with SPSS software. The findings reveal that these factors collectively contribute to 70.3% of the effectiveness in disaster response operations, highlighting the critical need for improved coordination, enhanced equipment, and more comprehensive training to strengthen the Marine Corps' disaster management capabilities.

Keywords: *Marine Corp Readiness, Joint Operations, Disaster Management, Human Resource*

INTRODUCTIONS

Indonesia is a country characterized by its vulnerability to a wide range of natural disasters, including floods, extreme weather events, earthquakes, and tsunamis. According to the 2019 World Risk Index, Indonesia ranks 37th out of 180 countries in terms of disaster vulnerability. The Indonesian National Armed Forces (Tentara Nasional Indonesia, TNI) hold the primary responsibility for safeguarding national sovereignty, preserving the unity of the Unitary State of the Republic of Indonesia, and ensuring the protection of all Indonesian citizens. In accordance with Law No. 34 of 2004, the Indonesian Marine Corps is tasked with conducting joint operations, one of which is disaster management. These efforts are integral to the nation's comprehensive approach to mitigating the impacts of natural disasters and enhancing national resilience.

Effective disaster management requires the readiness of the Indonesian Marine Corps, which plays a critical role in ensuring successful joint disaster response operations. The key indicators of the Indonesian Marine Corps' preparedness in such operations include: 1) communication readiness with disaster management stakeholders in the government, 2) the operational readiness of equipment, and 3) the preparedness of human resources within the Marine Corps.

Communication challenges include limited coordination with other stakeholders in disaster management. Disaster management effectiveness requires equipment readiness. Human resource challenges arise from limited human resource management to become more competent in disaster management. The effectiveness of disaster management conducted by the Indonesian Marine Corps is contingent upon several key factors, including communication readiness with relevant government stakeholders in disaster management, the availability and preparedness of equipment, and the preparedness of human resources. The definition of problems affecting the effectiveness of disaster management by the Marine Corps is intended to provide boundaries to the problems so that the perspectives of experts can be understood. The elaboration of the meaning of each problem is carried out as a basis for identifying the current condition of the problems and considering the achievement of the expected conditions after the research is conducted.

Based on the provided information, the research problems that can be identified are as follows:

a. Limited Coordination with Stakeholders. There are challenges in coordination and communication with other stakeholders in disaster management. This can hinder the effectiveness of disaster response and handling.
b. Equipment Readiness. There is a need to improve equipment readiness in joint disaster management operations. Insufficient or inadequate equipment can reduce the Indonesian Marine Corps' ability to respond to disasters quickly and effectively.
c. Limited Human Resources. There are challenges in managing and improving the qualifications of Marine Corps human resources involved in disaster management. Limitations in enhancing personnel competence and readiness can reduce their ability to face disasters.

Therefore, the focus of this research will be on exploring strategies and efforts to: enhance coordination with relevant stakeholders, improve the availability and preparedness of equipment, and elevate the qualifications and readiness of human resources in disaster management by the Indonesian Marine Corps.

METHOD

This research employs a quantitative approach to examine the impact of independent variables—namely Communication Readiness (X1), Equipment Readiness (X2), and Human Resource Readiness (X3)—on the dependent variable, Effectiveness (Y). Data for this study were collected through a questionnaire distributed to respondents, serving as the primary method of data acquisition. The data analysis process using SPSS software encompasses several critical stages, including the assessment of data quality, the conduct of Classical Assumption tests, and the implementation of Multiple Linear Regression Analysis.

Data quality testing serves to assess both the validity and reliability of the data. This process is grounded in the understanding that the integrity of data processing significantly impacts the overall quality of research outcomes. The continuity and success of the research process are contingent upon the validity of the data, which is ensured through rigorous validity and reliability testing. The data processing conducted through surveys must undergo a validity assessment, which is essential for determining the accuracy and reliability of the information provided by the respondents in the questionnaire. Decisions regarding the validity are made based on:

a. Comparing calculated r (r hitung) with r table
b. Comparing Sig (2-tailed) value with a probability of 0.05
c. A statement in the research variable indicator is considered valid if:

d. r calculated > r table
e. Alpha 5% > significance value

RESULTS AND DISCUSSION

Validity Testing

The validity test for the communication readiness variable, conducted through analysis using SPSS, will produce a calculated r-value, which will be compared to the critical r-value of 0.195 derived from 9 statements. The r-values obtained from the corrected item-total correlation for these 9 statements exceed the critical r-value. Therefore, it can be concluded that the items related to the communication readiness variable are valid.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
x1.1	26.23	10.159	.316	.749
x1.2	26.14	9.475	.407	.737
x1.3	26.24	9.538	.353	.747
x1.4	26.07	9.318	.519	.719
x1.5	26.31	9.549	.458	.728
x1.6	26.13	9.387	.390	.740
x1.7	26.30	9.061	.539	.715
x1.8	26.27	9.351	.513	.720
x1.9	26.39	9.816	.429	.733

Figure 1. Validity Testing of Communication Readiness Variables

The validity test for the equipment readiness variable was conducted using SPSS, which produced a calculated r-value. This value was then compared to the critical r-value of 0.195, derived from six statements. The calculated r-values, as presented in the corrected item-total correlation column for these six statements, exceeded the table r-value. Therefore, it can be concluded that the items associated with the equipment readiness variable are valid.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
x2.1	16.24	5.053	.312	.754
x2.2	16.28	4.406	.580	.681
x2.3	16.26	4.679	.492	.706
x2.4	16.18	4.412	.493	.706
x2.5	16.28	4.648	.496	.705
x2.6	16.26	4.538	.532	.695

Figure 2. Validity Testing of Communication equipment Variables

The validity test for the human resource readiness variable, performed using SPSS analysis, generates a calculated r-value that is compared to the critical r-value of 0.195 based on 9 statements. The calculated r-values, as shown in the corrected item-total correlation column for these 9 statements, exceed the table r-value. Therefore, it can be concluded that the items associated with the human resource readiness variable are valid.

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
x3.1	25.76	11.699	.414	.818
x3.2	25.85	10.816	.514	.808
x3.3	25.82	10.715	.558	.803
x3.4	25.78	10.456	.645	.792
x3.5	25.85	10.452	.643	.792
x3.6	25.85	11.220	.444	.816
x3.7	25.86	11.132	.427	.819
x3.8	25.82	10.998	.604	.799
x3.9	25.81	11.226	.510	.809

Figure 3. Validity Testing of Human Resource Readiness Variables

Reability Testing

The reliability test is conducted to assess whether the survey can be trusted as a valid data collection instrument. Therefore, the reliability or trustworthiness of the questionnaire must be evaluated. In the context of statistical analysis, reliability refers to the degree to which the instrument consistently measures the intended variable. Reliability testing aims to determine the stability and consistency of the questionnaire's items, ensuring that the results of the research remain dependable even when the study is repeated. A questionnaire is considered reliable or consistent when the Guttman split-half coefficient correlation exceeds the table value of the product moment (0.195).

In the reliability test conducted using instruments to assess the communication readiness variable (X1), which consisted of 9 questions administered to 100 respondents, the Guttman split-half coefficient yielded a value of 0.698, which exceeds the threshold of 0.195. Therefore, it can be concluded that the communication readiness variable is deemed reliable (Appendix 7). Similarly, for the equipment readiness variable (X2), which was evaluated using 6 questions administered to 100 respondents, the Guttman split-half coefficient was 0.752, surpassing the critical value of 0.195. Hence, it can be concluded that the equipment readiness variable is also reliable (Appendix 8). For the human resource readiness variable (X3), the reliability test was conducted using 9 questions with 100 respondents, and the Guttman split-half coefficient was found to be 0.823, which is greater than 0.195. Therefore, it can be concluded that the human resource readiness variable is considered reliable (Appendix 9). Finally, in the reliability test for the effectiveness variable (Y), which consisted of 13 questions administered to 100 respondents, the Guttman split-half coefficient was 0.761, exceeding the threshold of 0.195. Thus, it can be concluded that the effectiveness variable is reliable.

Reliability Statistics

Cronbach's Alpha	Part 1	Value	.714
		N of Items	7[a]
	Part 2	Value	.757
		N of Items	6[b]
	Total N of Items		13
Correlation Between Forms			.614
Spearman-Brown Coefficient	Equal Length		.761
	Unequal Length		.762
Guttman Split-Half Coefficient			.761

a. The items are: y.1, y.2, y.3, y.4, y.5, y.6, y.7.

b. The items are: y.7, y.8, y.9, y.10, y.11, y.12, y.13.

Figure 4. Reability Testing Results

Classical Assumption Tests

Classical assumption testing refers to a set of statistical procedures employed in regression analysis to assess whether the data adheres to the fundamental assumptions that underpin the regression model. These tests are typically conducted in conjunction with multiple linear regression analysis using SPSS. The primary objective of multiple linear regression analysis is to evaluate the impact of independent variables on the dependent variable. A robust multiple linear regression model is characterized by estimates that are accurate, unbiased, and consistent, while also satisfying normality assumptions and being free from violations of classical assumptions such as multicollinearity, heteroscedasticity, and autocorrelation. The classical assumption tests include normality tests, multicollinearity checks, and heteroscedasticity tests. The steps involved in performing this analysis using SPSS are as follows: 1) The primary dataset used for multiple linear regression analysis is typically cross-sectional data, which comprises the total responses for each variable from the questionnaire; 2) Navigate to Analyze > Regression > Linear in SPSS, and enter the variables according to their respective types in the Linear Regression dialog box.

The normality test is a statistical procedure employed to determine whether a sample or a dataset adheres to a normal distribution, also known as the Gaussian distribution. A normal distribution is characterized by its bell-shaped curve or "S" curve, where the majority of data points are clustered around the mean, exhibiting symmetric dispersion. The criterion for assessing normality is based on the visual inspection of the plotted data in a P-Plot. If the data points in the P-Plot align closely with the diagonal line, the dataset can be considered to follow a normal distribution. In this context, the results of the plot suggest that the data points are distributed along the diagonal, signifying that the research variables conform to a normal distribution.

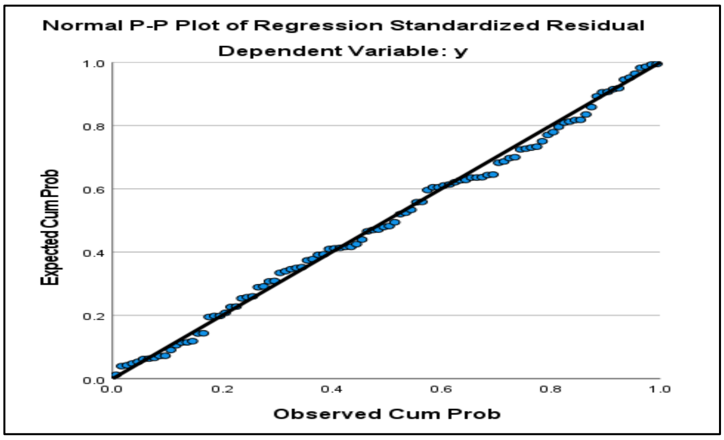

Figure 5. P-Plot Testing Results

The multicollinearity test is a statistical procedure employed to detect potential multicollinearity issues in regression analysis. Multicollinearity arises when two or more independent variables in a regression model exhibit a strong interrelationship, thereby complicating the identification of the distinct effects of each independent variable on the dependent variable. The criteria for diagnosing multicollinearity are based on the Tolerance value and the Variance Inflation Factor (VIF). A Tolerance value greater than 0.100 and a VIF value less than 10.00 are indicative of the absence of multicollinearity. In this study, all independent variables in the regression model exhibit Tolerance values exceeding 0.100, and their corresponding VIF values are all below 10.00. Consequently, it can be concluded that multicollinearity is not present among the independent variables in this regression model.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	5.129	2.573		1.993	.049		
	x1	.268	.110	.186	2.448	.016	.533	1.875
	x2	.660	.158	.338	4.190	.000	.475	2.103
	x3	.567	.108	.425	5.240	.000	.470	2.129

a. Dependent Variable: y

Figure 6. Multicollinearity Test Results

The subsequent step in conducting classical assumption tests is the heteroscedasticity test, which aims to assess whether the research data exhibits unequal variances of residuals across different observations. The criterion for this test is that the regression model should not display signs of heteroscedasticity, evidenced by the absence of a discernible pattern in the scatter plot, with residuals evenly distributed both above and below zero on the Y-axis. In the regression model of this study, all independent variables exhibit no distinct pattern in the scatter plots, and the residuals are symmetrically distributed above and below zero on the Y-axis. Therefore, it can be concluded that heteroscedasticity is not present in the tested variables.

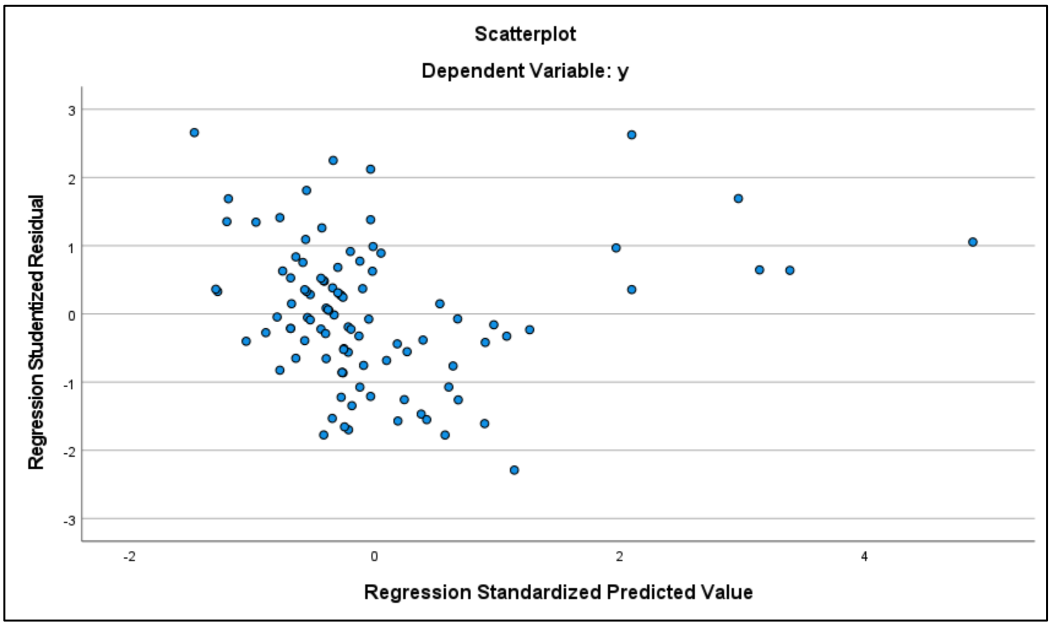

Figure 7. Heteroscedasticity Test Results

The analysis of the hypothesis concerning the relationship between independent and dependent variables is conducted using multiple linear regression analysis, which is represented by a mathematical regression equation. This process involves partial t-tests to assess the individual effect of each independent variable on the dependent variable, as well as an F-test to examine the overall, simultaneous relationship between the independent and dependent variables.

The partial t-test is employed to assess the effect of the independent variable (X) on the dependent variable (Y). This test is conducted by examining whether the significance value (Sig 2-tailed) exceeds 0.05 and by comparing the calculated t-value to the critical t-value from the t-distribution table. The conclusions derived from this analysis are as follows:

a. Based on the results of the Sig (2-Tailed) values, the communication readiness variable (X1) yielded a value of 0.016, which is less than the 0.05 threshold; the equipment readiness variable (X2) yielded a value of 0.000, also below the 0.05 threshold; and the human resource readiness variable (X3) showed a value of 0.000, indicating a similar outcome. These findings suggest that the communication readiness (X1), equipment readiness (X2), and human resource readiness (X3) variables have a partial influence on the effectiveness of disaster response (Y).
b. Based on the calculated t-value, which exceeds the t-table value, the t-table value was derived from the t-distribution table with a sample size (n) of 100, at a significance level of 0.05, and degrees of freedom (df) of 99 (calculated as n-1 = 100-1). The residual degree of freedom is 96 (see Appendix 15). Consequently, the t-table value is 1.664.
c. The calculated t-values for the communication readiness variable (X1) is 2.448, which is less than the critical value of 1.664; for the equipment readiness variable (X2), the t-value is 4.190, also less than 1.664; and for the human resource readiness variable (X3), the t-value is 5.240, which is again less than 1.664. Based on these results, it can be concluded that the communication readiness (X1), equipment readiness (X2), and human resource readiness (X3) variables each have a partial influence on the effectiveness of disaster response (Y).

The simultaneous F-test is used to assess the collective impact of independent variables (X) on the dependent variable (Y). The F-test is conducted by examining whether the significance value (Sig. 2-tailed) is less than 0.05 and comparing the calculated F-value to the critical F-value from the F-distribution table. The results of the simultaneous F-test indicate whether the independent variables, when considered together, significantly affect the dependent variable:

a. The significance value (Sig. 2-tailed) must be less than 0.05. Based on the table above, the Sig. (2-tailed) value is 0.000, which is less than 0.05. This indicates that the variables of communication readiness (X1), equipment readiness (X2), and human resource readiness (X3) collectively have a significant impact on the effectiveness of disaster response (Y).
b. The computed F-value exceeds the critical F-value. The critical F-value is derived using degrees of freedom, where df1 = k - 1 and df2 = n - k. In this context, k represents the total number of variables (both independent and dependent), and n refers to the total number of observations or samples used in the regression analysis. For this study, df1 = 4 - 1 = 3 and df2 = 100 - 3 = 97. Given a sample size of 100 respondents, the critical F-value obtained from the F-distribution table is 2.698.

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1683.123	3	561.041	75.766	.000[b]
	Residual	710.877	96	7.405		
	Total	2394.000	99			
a. Dependent Variable: y						
b. Predictors: (Constant), x3, x1, x2						

Figure 8. Simultaneous F Test

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c. Using SPSS, the analysis reveals a calculated F value of 75.766. This exceeds the critical F value of 2.698, indicating that the calculated F value (75.766 > 2.698) suggests that the communication readiness variable (X1), equipment readiness variable (X2), and human resource readiness variable (X3) collectively have a significant impact on the effectiveness of disaster response (Y).

The coefficient of determination quantifies the extent to which the independent variables influence the dependent variable, offering a means to assess and predict the strength of the relationships between variable X and variable Y simultaneously. This measure is typically represented by the R-squared (R^2) value, which reflects the proportion of the variance in the dependent variable that can be explained by the independent variables.

Model Summary[b]				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.838[a]	.703	.694	2.721
a. Predictors: (Constant), x3, x1, x2				
b. Dependent Variable: y				

Figure 9. Coefficient Determination Test

Based on the coefficient of determination table, the R-squared value is 0.703. This indicates that the independent variables—communication readiness (X1), equipment readiness (X2), and human resource readiness (X3)—together account for 70.3% of the variance in the effectiveness of disaster response (Y). The remaining 29.7% may be influenced by other factors not included in this regression model or variables not examined in this study. To assess the strength of the correlation, the Guilford criteria can be applied (Appendix 20). The coefficient of determination (R) is found to be 0.838, suggesting, according to Guilford's criteria, a strong and significant relationship between the independent variables (X) and the dependent variable (Y).

CONCLUSION

a. There is a significant impact of communication readiness, equipment preparedness, and human resource preparedness on the effectiveness of disaster assistance in facilitating coordinated operations.
b. The communication readiness variable (X1), equipment readiness variable (X2), and human resource readiness variable (X3) collectively account for 70.3% of the variance in the effectiveness of disaster response (Y). The remaining 29.7% may be influenced by other factors not included in this regression model or by variables that were not examined in this study.

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