THE IMPACT OF PERSONNEL SAFETY CULTURE ON AVIATION SAFETY AT HAJI HASAN AROEBOESMAN ENDE EAST NUSA TENGGARA

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ABSTRACT
Aviation safety is a fundamental factor and is a top priority and a joint commitment of airport operators. This research conducted was motivated by the result of observations on several aspects of airport operations in optimizing safety management related to the effect of safety culture or personnel safety culture on aviation safety at Haji Hasan Aroeboesman Ende Airport. This research employs a quantitative approach, with data gathered through direct observation and literature review, and questionnaire instrument distributed to 34 aviation security personnel. The collected data was tested by the spearman rank correlation test and analyzed using simple linear regression to find out how the personnel safety culture affects aviation safety. The results showed that there was a significant positive influence between safety culture on flight safety with a correlation value of 0.759 which was included in the category of high correlation coefficient.

Keywords: Safety Culture, Aviation Safety, Personnel, Quantitative

1. INTRODUCTION

Transportation is very necessary as a support for various activities, such as economic activities, procurement of goods and services, or means of mobility for the community One of the transportation modes in Indonesia is air transportation, which can be a choice of mobility for people who want to travel far but with relatively faster and more efficient travel time [1]. Haji Hasan Aroeboesman Airport, who has WATE as its ICAO Code and ENE as its IATA code, is a class II airport operator located in Ende Regency, Flores, East Nusa Tenggara serving flights to and from Ende City. Airports involve human resources , equipment, facilities, and systems and procedures that meet the provisions of applicable requirements or standards to support aviation safety which is the top priority of every operation in the aviation industry.

Aviation safety is a fundamental factor and has become a shared commitment that must be fulfilled for every airport operator in the aviation industry [2]. Meanwhile safety itself defined safety as a condition in which the risk of injury to a person or damage to something has been minimized and maintained at a predetermined level or lower through hazard identification and consistent risk management procedures [3].

Aviation safety is a non-negotiable aspect. All elements of airport services must be meticulously designed and operated in accordance with international safety standards [4]. Aviation safety starts from the smallest unit, the individuals who will make habits a safety culture. The implementation of safety culture is one of the efforts that must be made in addition to the regulations that have been set to create aviation safety.

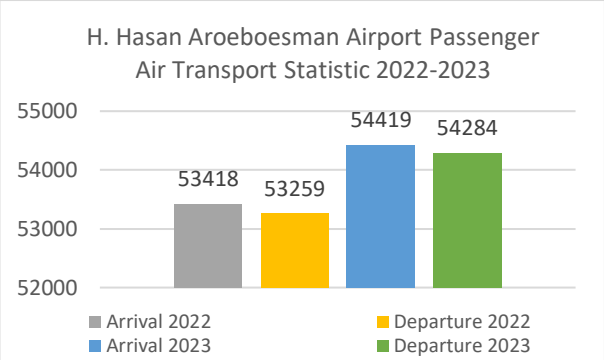

Figure 1 H. Hasan Aroeboesman Airport Passenger Air Transport Statistic 2022-2023 [5].

The increase in activity at the airport, both for arriving and departing passengers, indirectly affects the safety management system at the airport. ECAST (European Commercial Aviation Safety Team) states that an safety management system can't be effective without

an appropriate safety culture. Safety culture consists of the lasting values and attitudes related to safety that are shared by every member across all stage of the organization [6]. This increase in activity can lead to ineffective supervision of airport passengers, which in turn can result in accidents in the implementation of safety culture Monitoring safety at the airport encompasses all activities carried out by all parties.

As stipulated in Republic Indonesia's Government Regulation number 3 on 2001 concerning Aviation Security and Safety, that every person and goods must go through security check [3]. At terminal of Haji Hasan Aroeboesman Ende Airport, there are several challenges related to safety culture as well as a shortage of aviation security personnel resulting in the cctv monitoring area being left unattended and the arrival area being guarded by the same personnel as those at the security check point. Furthermore, there are challenges with supporting facilities such as the x-ray machine at passenger security check point being damaged, necessitating mitigation in the form of diverting the inspection flow of passengers carry-on baggage through holding baggage security check point. Nevertheless, aviation security personnel must diligently and carefully inspect all passenger luggage as they enter the departure terminal area, from check-in to boarding the aircraft, as well as screen individuals entering restricted security zones and conduct ground and air patrols at asset and perimeter gates, which are essential components of aviation safety. In carrying out their roles and duties, it is necessary to adhere to the regulations and rules stipulated in the standard operational procedure that align with the safety culture at the airport, which falls under the authority of aviation security officers in ensuring flight safety. Safety culture directly impacts flight safety performance as it relates to human resources as the implementers.

2. METHOD

2.1. Research Design

The researcher utilized a quantitative method for data collection. This method is based on the principles of positivist philosophy, focusing on concrete data, and are used to study specific populations or samples. Data collection is carried out using research instruments, and the data are in the form of numbers, which are measured using statistical tools to address the research problem [7]. Quantitative or statistical data analysis involves breaking down data into smaller parts to address research questions through statistical procedure to ultimately draw conclusions [8].

2.2. Research Setting

The research was conducted at Haji Hasan Aroeboesman Airport in Ende Regency, East Nusa Tenggara. This location was chosen because the researcher had previously completed an on the job training program for three months, from December 2023 to March 2024. During on the on the job training the researcher provided an opportunity to identified certain issues at the location by observation, which led to the continuation of this final project research until July 2024.

2.3. Research Variables

The study involves two types of variables, which is independent variable (Variable X) and dependent variable (Variable Y).

Figure 2. Research Variable

Variable X can also be knows as a stimulus, predictor antecedent, or exogenous variable [9]. In this study, Variable X represents personnel safety culture. On the other hand, Variable Y is the one that is impact by independent variable [9]. It reflects the outcome resul from the independent variable. In this study, Variable Y is the aviation safety.

2.4. Population and Sample

A sample refers to a portion of this population, selected using specific methods, that exhibits comprehensive and representative characteristics of wider population [7]. The population comprises all 34 aviation security personnel at Haji Hasan Aroeboesman Airport in Ende. Meanwhile, the sample used for this study is saturated sampling. Saturated sampling is technique where every member of the population is included in the sample.

2.5. Data Collection Techniques

2.4.1. Observation

Observation is a method utilized to collect data by directly observing and perceiving phenomena [10]. The purpose of using observation in this study is to analyze the personnel safety culture at Haji Hasan Aroeboesman Airport in Ende. Based on this explanation, direct observation was conducted in this research by observing both the staff and passengers at Haji Hasan Aroeboesman Airport in Ende during on the job training program since December 11, 2023 to March 1, 2024.

2.4.2 Literature Review

This is a crucial phase where, after determining the research topic, then involves an in-depth examination of

theories relevant to that topic [11]. During this process, the researcher collects extensive information from various sources, including books, academic journals, research documents including theses and dissertations, and other pertinent sources such as online materials, magazines, and newspapers. The literature review aims to revisit regulations and requirements, reassess factors that may contribute to issues, and provide guidelines and references related to definitions relevant to the research problem. It also includes a detailed exploration of the research topic. Literature review is employed to investigate issues related to the impact of personnel safety culture on aviation safety at Haji Hasan Aroeboesman Ende Airport in East Nusa Tenggara.

2.4.3 Questionnaire

In this study, the questionnaire addresses statements related to six indicators of safety culture. The Likert scale is utilized as a tool to assess attitudes, opinions, and perceptions about a specific phenomenon. Here, the Likert scale is employed to gauge opinions and perceptions of safety culture based on the responses gathered from the questionnaire.

Table 1 Likert Scale

Number	Symbol	Description	Score
1.	SA	Strongly Agree	5
2.	A	Agree	4
3.	N	Neutral	3
4.	D	Disagree	2
5.	SD	Strongly Disagree	1

The questionnaire was administered using a Likert scale to gather comprehensive responses from all participants. The data was analyzed by multiplying each response by a corresponding weight, as defined in the value weight table. The calculated results from the respondents' answers are as follows:

1) Repondents who answered “strongly agree” (5) = 5 × n = n
2) Repondents who answered “agree” (4) = 4 × n = n
3) Repondents who answered “neutral” (3) = 3 × n = n
4) Repondents who answered “disagree” (2) = 2 × n = n
5) Repondents who answered “strongly disagree” (1) = 4 × n = n

Total score represented as n, which n where n is the value derived from the respondents' answers. After determining the total score, the next step is to interpret the respondents' assessments using the Index% formula. The calculated index is then placed into a percentage value table to evaluate whether it aligns with the "strongly agree" scale or other parts of the scale. The Index(%) formula is given by

$$\text{Index\% Formula} = \frac{\text{Total Score}}{\text{X}} \times 100 \quad (1)$$

Subsequently, the calculated index values are entered into a percentage value table to determine their position on the agreement scale. The Index Formula % is multiplied by 100, and the resulting data is categorized into the percentage value table to identify where it aligns on the scale.

Table 2 Likert Scale Response Index [12]

Percentage	Description
0% - 19.99%	Strongly Agree
20% - 39.99%	Agree
40% - 59.99%	Neutral
60% - 79.99%	Disagree
80% - 100%	Strongly Disagree

2.6. Data Analysist Techniques

2.5.1. Validity Test

Validity test is used to to determine how well the measurement tool, in this case, the questionnaire, accurately reflects the concept or variable it is intended to measure. Validity refers to the extent to which the questionnaire’s questions effectively measure the targeted concept or variable. Specific criteria are used in Pearson Product Moment validity testing to to verify whether the data is valid or not. Meanwhile, tests with low validity will produce data that is not related to the measurement purpose [13].

1.5.2 Reliability Test

To determine the consistency of the measuring instrument, if measurements are carried out in the future and it can be relied upon and remain consistent, so reliabily test is used [14].

1.5.3 Normality Test

The normality test aims to ascertain whether the distribution of the residual variable in a regression model adheres to a normal distribution pattern [15]. Using the Kolmogorov-Smirnov normality test, the degree of fit between a specific theoretical distribution and the sample data is assessed to determine whether the scores in the sample could reasonably originate from a population with that particular distribution [16].

2.5.4. Correlation Test

Spearman's Rank Correlation Coefficient is a hypothesis test used to determine the relationship between two variables. Spearman's Rank Correlation is employed to assess the degree of association or test the significance of an associative hypothesis when the data for each variable is ordinal. To determine whether there is a relationship or correlation between these variables, the correlation coefficient formula is used. The correlation coefficient (CC) is an index or number used to measure the strength (strong, weak, or none) of the relationship between variables [17]. Once the coefficient value is determined, the strength of the correlation of variables can be evaluated by the following CC values as a reference.

Table 3. Categories of Spearman Rank Correlation Coefficient [17]

Coefficient	Categories
CC = 0.00	No Correlation
0 < CC ≤ 0.20	Very Low/Very Weak Correlation
0.20 < CC ≤ 0.40	Low/Weak Correlation
0.40 < CC ≤ 0.70	High/Strong Correlation
0.70 < CC ≤ 0.90	Very High/Strong Correlation
CC = 1	Perfect Correlation

2.5.5. Simple Regression Analysis

Simple regression analysis based on the relationship between one independent variable and one dependent variable [18]. Thus, simple linear regression analysis is employed to identify the presence of a linear influence of the variable.

In statistics, there is a data scale that is divided into 4 namely: nominal, ordinal, interval and ratio [19]. Data scale is one of the things that must be considered in conducting data analysis. This is because each analysis method requires the type of data that can be used with that method. There are linear regression conditions, including:

1. Variable X must be feasible (Validity and Reliability Test).
2. Normally distributed data (Normality Test).
3. There is a relationship between variable X and variable Y (Correlation Test).
4. Interval or ratio scaled data.

If ordinal scale data is still used in linear regression analysis, an incorrect interpretation of the regression model will be obtained The recommended approach is to either continue using ordinal data and change the data analysis technique, or transform the data from nominal to interval so that linear regression analysis can be applied.

Therefore, in order to perform linear regression analysis, the transformation of ordinal scale data into interval scale data is carried out using the Method of Successive Interval (MSI) transformation method [20], which is then analyzed using simple linear regression to determine the extent of the influence of the personnel safety culture on aviation safety using general simple regression equation is given by:

$$Y = a + b X \quad (2)$$

Increase or decrease of dependent variables based on independent variables. If b (+) then it goes up, if b (-) it goes down.

Additionally, hypothesis testing in simple linear regression analysis is conducted to evaluate whether a proposed hypothesis should be accepted or rejected. This process relies on two key criteria for decision-making: firstly, by assessing the significance value, and secondly, by comparing the calculated t-value with the critical value from the t-distribution table [21].

To determine the extension of the influence of the x variable on the y variable in simple linear regression analysis, one can refer to the R Square (R^2) value [22]. A low coefficient of determination indicates that the independent variable's ability to explain the dependent variable is very limited. In other hand, if the R^2 value is close to 1 (one) and distant from 0 (zero), it suggests that the independent variable has strong ability to provide all the necessary information to predict the dependent variable [23].

3. RESULT AND DISCUSSION

The primary data in this research was obtained by distributing questionnaires directly to obtain data on the influence of safety culture or personnel safety culture on aviation safety at Haji Hasan Aroeboesman Ende Airport. The data collection method involved distributing questionnaires to 34 respondents for all aviation security personnel, during on the job training at Haji Hasan Aroeboesman Ende Airport which has passed validity and reliability tests with the following results.

Correlations

		X1	X2	X3	X4	X5	X6	TOTAL_X
X1	Pearson Correlation	1	.624**	.706**	.514**	.638**	.630**	.816**
	Sig. (2-tailed)		.000	.000	.002	.000	.000	.000
	N	34	34	34	34	34	34	34
X2	Pearson Correlation	.624**	1	.655**	.573**	.616**	.741**	.846**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	34	34	34	34	34	34	34
X3	Pearson Correlation	.706**	.655**	1	.545**	.818**	.777**	.895**
	Sig. (2-tailed)	.000	.000		.001	.000	.000	.000
	N	34	34	34	34	34	34	34
X4	Pearson Correlation	.514**	.573**	.545**	1	.521**	.543**	.735**
	Sig. (2-tailed)	.002	.000	.001		.002	.001	.000
	N	34	34	34	34	34	34	34
X5	Pearson Correlation	.638**	.616**	.818**	.521**	1	.670**	.845**
	Sig. (2-tailed)	.000	.000	.000	.002		.000	.000
	N	34	34	34	34	34	34	34
X6	Pearson Correlation	.630**	.741**	.777**	.543**	.670**	1	.876**
	Sig. (2-tailed)	.000	.000	.000	.001	.000		.000
	N	34	34	34	34	34	34	34
TOTAL_X	Pearson Correlation	.816**	.846**	.895**	.735**	.845**	.876**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	34	34	34	34	34	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 2. X variable's pearson product moment validity test result

Correlations

		Y1	Y2	Y3	Y4	TOTAL_Y
Y1	Pearson Correlation	1	.766**	.642**	.776**	.884**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	34	34	34	34	34
Y2	Pearson Correlation	.766**	1	.823**	.776**	.933**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	34	34	34	34	34
Y3	Pearson Correlation	.642**	.823**	1	.709**	.878**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	34	34	34	34	34
Y4	Pearson Correlation	.776**	.776**	.709**	1	.907**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	34	34	34	34	34
TOTAL_Y	Pearson Correlation	.884**	.933**	.878**	.907**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	34	34	34	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 3. Y variable's pearson product moment validity test result

Table 4. Recapitulation of Validity Test

Indicator	R_{count}	< R_{table}	Decision
X1	0,816	0,349	Valid
X2	0,846	0,349	Valid
X3	0,895	0,349	Valid
X4	0,735	0,349	Valid
X5	0,845	0,349	Valid
X6	0,876	0,349	Valid
Y1	0,884	0,349	Valid
Y2	0,933	0,349	Valid
Y3	0,878	0,349	Valid
Y4	0,907	0,349	Valid

The data is considered valid if the Pearson correlation is greater than the r-table value. A higher Pearson correlation indicates a stronger validity. Using the r-table while df = 34-2 = 32; alpha = 5% with a value of 0.349, all pearson correlation values exceeding the r-table value indicate that the ratios is valid. This confirms that all indicators of the variable that used in this study are valid and appropriate for use.

Furthermore, from the output results, it can be seen that the Cronbach's Alpha value obtained is greater than (>) 0.60 for both variables. Therefore, it can be concluded that the items of both variables are reliable.

Reliability Statistics

Cronbach's Alpha	N of Items
.913	6

Reliability Statistics

Cronbach's Alpha	N of Items
.923	4

Figure 4. Result of Cronbach's Alpha Reliability test

Based on the questionnaire results that have been submitted to the respondents, the next step for the researcher is to perform calculations using the Likert scale formula [7], where the statistical results are as follows:

Variable X						
Statement	Data					Index% Total (%)
	5	4	3	2	1	
	SA	A	N	DA	SD	
1	11	18	5	0	0	83.53
2	15	13	6	0	0	85.29
3	12	17	5	0	0	84.11
4	16	14	4	0	0	87.05
5	9	19	6	0	0	81.76
6	14	13	7	0	0	84.11
Average						84.30
Variable Y						
7	15	14	5	0	0	85.88
8	15	14	5	0	0	85.88
9	13	16	5	0	0	84.70
10	14	14	6	0	0	84.70
Average						86.29

The respondent data analyzed using simple linear regression then. Before conducting the regression analysis, a normality test was performed.

One-Sample Kolmogorov-Smirnov Test

		Unstandardized Residual
N		34
Normal Parameters[a,b]	Mean	.0000000
	Std. Deviation	1.66736612
Most Extreme Differences	Absolute	.116
	Positive	.116
	Negative	-.061
Test Statistic		.116
Asymp. Sig. (2-tailed)		.200[c,d]

a. Test distribution is Normal.
b. Calculated from data.
c. Lilliefors Significance Correction.
d. This is a lower bound of the true significance.

Figure 5. Kolmogorov-Smirnov Normality Test Result

The Kolmogorov-Smirnov normality test resulted in a significance value of 0.200, and this value is greater than 0.05. Therefore, it can be concluded that the residual data values are normally distributed.

Correlations

			Safety_Culture	Keselamatan_Penerbangan
Spearman's rho	Safety_Culture	Correlation Coefficient	1.000	.759**
		Sig. (2-tailed)	.	.000
		N	34	34
	Keselamatan_Penerbangan	Correlation Coefficient	.759**	1.000
		Sig. (2-tailed)	.000	.
		N	34	34

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6. Rank Spearman Correlation Test Result

The correlation coefficient obtained from the Spearman rank correlation test is 0.759 which has a positive value, meaning that there is a relationship that belongs to the category of correlation or a strong relationship between variable X and variable Y and the direction of the relationship is unidirectional. After undergoing validity testing, reliability testing, normality testing, and correlation testing, the data can then be analyzed using simple linear regression after being transformed from ordinal data to interval data using Method of Successive Interval.

Besides obtain the mathematical relationship pattern between variables, this analysis can also be used to determine the extent of the change in variable X in relation to variable Y. Additionally, it can be used to predict variable Y when the value of variable X is known The basic principle of simple linear regression equation is that there must be a correlation between variable X and variable Y, which has been tested in previous correlation tests.

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.866	1.301		1.434	.161
	Safety Culture	.548	.083	.761	6.645	.000

a. Dependent Variable: Keselamatan Penerbangan

Figure 7. Result of simple linear regression test

The general formula for simple linear regression is given by Y = a + bX, where 'a' represents a constant value obtained as 1.866. This constant value comes from the unstandardized coefficients of the Flight Safety variable (Y), meaning that if the Safety Culture Personnel variable (X) has a value of 0 or does not exist, the constant value for Flight Safety (Y) is 1.866. Meanwhile, 'b' represents variable X's regression coefficient, with a value of 0.548. This number signifies an increase of one unit in Safety Culture Personnel (X), the value of Aviation Safety (Y) will increase by 0.548. The regression coefficient is positive, meaning that the direction of influence of Variable X on Variable Y is positive. Therefore, the simplified linear regression equation is Y = 1.866 + 0548X.

The basis for decision-making in hypothesis assessment in simple linear regression analysis is that if the significance probability value is less than 005 (5%) or the calculated t-value is greater than the tabled t-value, it can be said that an independent variable x significantly influences the dependent variable y [16]. Based on the results of the calculated t-value, it has been determined that the significance value (Sig) is 0.000, which is smaller than the probability value of 0.05. Furthermore, comparing the calculated t-value of 6.645 with the critical t-value of 2.037, it is evident that the calculated t-value is greater, leading to the rejection of H0 and acceptance of H1. Thus, it can be concluded that there is an influence of Safety Culture Personnel (X) on Aviation Safety (Y)

Figure 8. Simple Linear Regression Result

Next, to assess the extent of the influence of variable X on variable Y in simple linear regression analysis, the R square (R^2) value can be used as a reference, obtained

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.761[a]	.580	.567	2.127508

a. Predictors: (Constant), Safety Culture

from the model summary.

Furthermore, to assess the extension of the impact of variable x on variable y in simple linear regression analysis, the R square value (R^2) can serve as a reference. It is known from the model summary output that the R square value is 0.580, which falls into the moderate category [24]. This value indicates that the influence of

Safety Culture Personnel (X) on Aviation Safety (Y) is 58%, while the remaining 42% of Aviation Safety is impacted by other else variables that not examined in this study.

4. CONCLUSION

Based on the questionnaire results, the awareness indicator in the safety culture variable obtained the highest percentage index score of 87.05% This indicates that personnel at Haji Hasan Aroeboesman Ende Airport have a high awareness of the importance of flight safety and are aware of their role and responsibility in maintaining flight safety by demonstrating strong commitment to following safety procedures

There is a moderate influence of 0.580 between safety culture personnel (X) and flight safety (Y) Based on the calculation of the Spearman rank correlation coefficient, the result is 0759, which is positive This means there is a strong correlation between variable X and variable Y, and the direction of this relationship is positive.

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