The Influence of Aviation Security Performance on Flight Security at Sultan Babullah Airport, Ternate

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ABSTRACT

This study aims to determine the influence of Aviation Security (Avsec) performance on flight security at Sultan Babullah Airport in Ternate. The research background is based on the critical role of Avsec in maintaining a reliable airport security system, considering the high risk of security threats that can endanger aviation safety. Internal factors such as licensing, human factors, and the effectiveness of security inspection equipment are the main focus in assessing Avsec performance. This study uses a quantitative descriptive research method. Data were collected through questionnaires distributed to 42 Avsec officers as a sample out of a total population of 72, using purposive sampling. The data were analyzed using validity tests, reliability tests, correlation analysis, simple linear regression, and t-tests with the aid of SPSS software. The results showed that Avsec performance has a significant effect on aviation security. The coefficient of determination indicates that Avsec performance contributes 72.1% to the level of flight security at Sultan Babullah Airport. These findings emphasize the importance of improving officer competence, compliance with SOPs, and the availability of adequate security equipment as part of strategies to enhance flight security.

Keywords: Aviation Security, Flight Security, Airport, Human Factor, Avsec Performance.

1 INTRODUCTION

Aviation security is a crucial factor in airport operations, given the high risk to flight safety from potential security threats on the ground and in the air. Aviation Security (Avsec) personnel play a strategic role in ensuring that all security processes, from passenger and baggage screening to access control to restricted areas, are conducted in accordance with applicable regulations to prevent unlawful acts[1]. The success of Avsec depends not only on the sophistication of the technology used but also on human resource factors, including officer competency, adherence to standard operating procedures (SOPs), and the availability of adequate screening equipment.

Sultan Babullah Ternate Airport, as a key domestic airport in North Maluku, faces several challenges in maintaining flight security. Key issues identified include problems with Avsec officer licensing, where some personnel may not possess a valid or current license required by civil aviation regulations[2]. Human factors, such as fatigue, stress, and lack of periodic training, can affect the meticulousness of officers in detecting security threats[3]. Furthermore, limitations in the performance or availability of security screening equipment like X-rays and Walk-Through Metal Detectors (WTMD) can hinder the inspection process and increase risks[4]. Non-compliance with SOPs has also been observed, indicating a need for stricter enforcement and supervision.

Previous studies have generally focused on the overall link between Avsec performance and flight security[5]. However, a research gap exists concerning the specific impact of internal factors. This study introduces novelty by focusing specifically on these internal factors: licensing, human factors, and the effectiveness of security equipment. Therefore, this research aims to analyze the influence of Avsec performance on flight security at Sultan Babullah Airport, Ternate, by concentrating on these more specific components.

2 METHODS

2.1 Research Design

There are several stages carried out by the author in determining the research design of this Final Project. The following is the research design used.

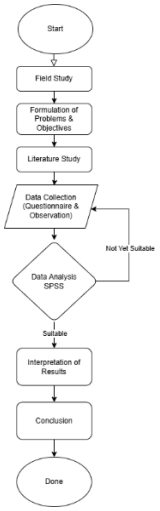

Figure 1. Research Design

This study employed a quantitative descriptive method to provide an in-depth picture of the phenomenon under investigation. The research design focused on analyzing the relationship between an independent variable, Avsec Performance (X), and a dependent variable, Flight Security (Y). The hypothesis for this study was formulated as follows:

H_0: There is no significant influence of Avsec Performance on the sustainability of security at Sultan Babullah Ternate Airport.

H_1: There is a significant influence of Avsec Performance on the sustainability of security at Sultan Babullah Ternate Airport.

2.2 Population and Sample

The population for this research comprised all 72 Avsec officers on duty at Sultan Babullah Ternate Airport. A sample of 42 officers was selected using the Slovin formula with a 10% margin of error. The sampling technique used was purposive sampling, with criteria including a minimum of two years of work experience and possession of a flight security certification.

2.3 Data Collection

The primary data collection instrument was a questionnaire distributed to the Avsec officers. The questionnaire was designed using a Likert scale with four response options: Strongly Agree (4), Agree (3), Disagree (2), and Strongly Disagree (1). Data were also gathered through documentation and a literature review of relevant regulations and previous studies.

2.4 Data Analysis

The collected data were analyzed using the Statistical Package for the Social Sciences (SPSS) software. The analysis included several statistical tests:

1. Validity Test: Pearson Product-Moment correlation was used to ensure that each item in the questionnaire accurately measured its intended construct.
2. Correlatioin Test: This test was conducted to identify the strength and direction of the relationship between the independent and dependent variables. Pearson's correlation coefficient (r) was used to determine whether a linear relationship exists and whether it is positive or negative.
3. Reliability Test: Cronbach's Alpha was used to measure the internal consistency and stability of the instrument.
4. Simple Linear Regression: This test was used to determine the extent of the influence of the independent variable on the dependent variable.
5. T-Test: This partial test was used to verify the significance of the influence of the independent variable on the dependent variable.

3 RESULTS AND DISCUSSIONS

3.1 Respondent Demographics

The demographic profile of the 42 respondents was analyzed based on age, work experience, and current position, as presented in Figure 2.

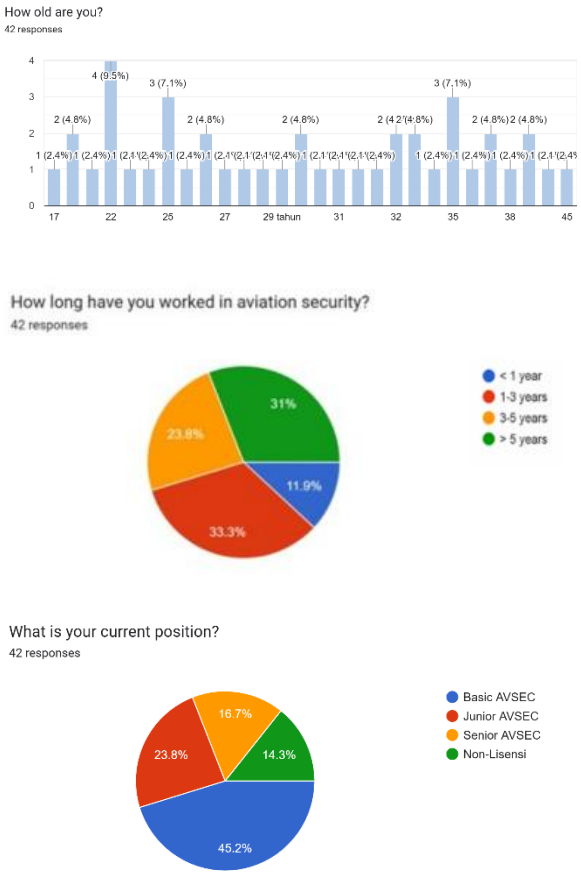

Figure 2. Respondent Demographics

The 42 respondents were distributed across a productive age range, with the largest group being 22 years old (9.5%). A majority of respondents have been working in aviation security for 1-3 years (33.3%), followed by those with over 5 years of experience (31%). In terms of position, most respondents were Basic AVSEC (45.2%), followed by Junior AVSEC (23.8%) and Senior AVSEC (16.7%), with 14.3% being non-licensed.

3.2 Instrument Testing

To ensure the accuracy and consistency of the questionnaire instrument, two primary psychometric tests were conducted: a validity test and a reliability test. The successful outcome of these tests is essential for confirming the integrity of the data collected for this study.

Validity Test: A validity test was conducted to ascertain the degree to which each questionnaire item accurately measures its intended construct. This assessment utilized the Pearson

Correlation method. An item was deemed valid if its calculated R Value was greater than the R Table Value (0.304 for df=40, α=0.05) and its significance value was less than 0.05. The complete results of this test are presented in Table 1.

Table 1. Summary of Validity Test

Item	R Table Value	R Value	Sig.	Validity
X1	0.304	0.719	0.000	Valid
X2	0.304	0.650	0.000	Valid
X3	0.304	0.763	0.000	Valid
X4	0.304	0.834	0.000	Valid
X5	0.304	0.708	0.000	Valid
X6	0.304	0.815	0.000	Valid
X7	0.304	0.737	0.000	Valid
X8	0.304	0.673	0.000	Valid
X9	0.304	0.778	0.000	Valid
X10	0.304	0.761	0.000	Valid
Y1	0.304	0.679	0.000	Valid
Y2	0.304	0.774	0.000	Valid
Y3	0.304	0.815	0.000	Valid
Y4	0.304	0.728	0.000	Valid
Y5	0.304	0.692	0.000	Valid
Y6	0.304	0.768	0.000	Valid
Y7	0.304	0.621	0.004	Valid
Y8	0.304	0.627	0.000	Valid
Y9	0.304	0.707	0.000	Valid
Y10	0.304	0.815	0.000	Valid
Y11	0.304	0.744	0.000	Valid

As detailed in Table 1, the analysis confirms that all questionnaire items for both the Avsec Performance (X) and Flight Security (Y) variables were valid. This outcome establishes the instrument's content and construct validity, confirming its appropriateness for use in the subsequent stages of data analysis.

Reliability Test: Following the confirmation of the instrument's validity, a reliability test was performed to evaluate its internal consistency and stability over time. The Cronbach's Alpha method was employed for this purpose, with a coefficient above the 0.70 threshold considered indicative of high reliability. A summary of the reliability test results is shown in Figure 3.

Case Processing Summary

		N	%
Cases	Valid	42	100.0
	Excluded[a]	0	.0
	Total	42	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	N of Items
.908	10

Figure 3. Summary of Reliability Test

The analysis yielded a Cronbach's Alpha of 0.908 for the Avsec Performance (X) variable and 0.904 for the Flight Security (Y) variable. Since both coefficients significantly exceed the established threshold, the instrument is confirmed to possess a high degree of reliability, making it consistent and dependable for data collection. With the instrument established as both valid and reliable, the research could confidently proceed to hypothesis testing.

3.3 Hypothesis Testing

To empirically test the research hypothesis, a series of statistical analyses were conducted. This section details the correlation and regression tests used to examine the relationship between Avsec Performance (X) and Flight Security (Y).

Correlation Analysis: First, a Pearson correlation analysis was performed to measure the strength and direction of the linear relationship between the two variables. The results of this analysis are presented in Figure 4.

Correlations

		total_X	total_Y
total_X	Pearson Correlation	1	.849**
	Sig. (2-tailed)		.000
	N	42	42
total_Y	Pearson Correlation	.849**	1
	Sig. (2-tailed)	.000	
	N	42	42

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

Figure 4. Summary of Correlation Test

The analysis yielded a Pearson correlation coefficient (r) of 0.849 with a significance level of 0.000, which is less than the alpha of 0.05. This result indicates a very strong, positive, and statistically significant relationship between Avsec Performance and Flight Security.

Regression and T-Test Analysis: To determine the predictive influence of Avsec Performance on Flight Security, a simple linear regression analysis was conducted. This test also evaluates the statistical significance of the model through a t-test. The detailed output of the regression model is shown in Figure 5.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.849[a]	.721	.714	2.47150

a. Predictors: (Constant), total_X

Coefficients[a]

Model		Unstandardized Coefficients B	Unstandardized Coefficients Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	1.729	3.588		.482	.632
	total_X	1.011	.099	.849	10.161	.000

a. Dependent Variable: total_Y

Figure 5. Model Summary of Simple Linear Regression Test

The model summary produced an R-Square value of 0.721, indicating that 72.1% of the total variance in Flight Security can be explained by Avsec Performance. The remaining 27.9% is attributed to other factors not included in this model.

Furthermore, the t-test resulted in a t-value of 10.161 with a significance of 0.000, which confirms that the influence of Avsec Performance on Flight Security is statistically significant. Given these results, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is accepted, formally concluding that Avsec Performance has a significant positive influence on Flight Security at the studied airport.

3.4 Discussion

The finding that Avsec performance significantly influences flight security by 72.1% aligns with previous research. Studies by Suharyadi[6] and Arifin & Meilani[7] also concluded that the professionalism, licensing, and SOP compliance of Avsec personnel positively correlate with security effectiveness. This study further reinforces the arguments made by Afriyanto[8], who emphasized that competency acquired through national training programs is foundational for Avsec personnel to counter security threats effectively.

The results underscore that human-centric factors are paramount. The competency, discipline, and psychological stability of Avsec officers are critical determinants of the overall security system's success. This is consistent with the findings of Rosa et al.[2] on the impact of work stress on security personnel performance.

The practical implications for Sultan Babullah Airport management are clear. There is a need for continuous investment in Avsec human resources, including regular refreshment training, strict enforcement of licensing standards, and proactive management of work-related stress. These efforts will directly contribute to strengthening the airport's security environment.

Furthermore, the findings of this study are consistent with and reinforced by several previous empirical studies. Bramantha et al. [9] conducted a study at I Gusti Ngurah Rai International Airport in Bali and demonstrated that the performance of airside personnel, particularly Aviobridge operators, contributed significantly by 83.4% to the on-time performance of flights. This supports the present study's emphasis on the importance of personnel competence, compliance with standard operating procedures (SOPs), and psychological stability as critical determinants of operational efficiency and flight punctuality.

In the area of AVSEC training, Moonlight et al. [10] designed and validated an LMS-based electronic module for the Basic Aviation Security Course. The module showed high feasibility rated at 73% by trainees and 100% by experts and was proven to enhance the competence of AVSEC personnel, particularly in manual screening procedures using handheld metal detectors. These results highlight the potential of instructional technology in improving procedural compliance and operational readiness.

Similarly, Sitompul et al.[11] developed a visibility prediction system using a backpropagation neural network, which achieved a prediction accuracy of 93.22%. This study illustrates the relevance of technological solutions in supporting operational decision-making processes and enhancing aviation safety from a systems perspective.

Moreover, Oktavianingrum et al.[12] analyzed AVSEC staffing at Security Check Point 1 (SCP 1) at Sultan Thaha Jambi Airport and found that insufficient personnel adversely affected the effectiveness of passenger screening and operational flow. The study emphasized the need for human resource planning aligned with national standards, particularly the Indonesian Ministry of Transportation Regulation No. PM 211 of 2020, to ensure sufficient staffing levels and effective security control.

Collectively, these studies substantiate the current findings and underline the necessity of strategic capacity enhancement in aviation security, particularly in terms of personnel quantity, technical competence, and the adoption of technology to support safety and operational effectiveness in airport environments.

Theoretically, this study adds empirical evidence from a specific, less-explored operational region in Eastern Indonesia, enriching the literature on aviation security management.

4 CONCLUSION

This study concludes that Aviation Security (Avsec) performance has a strong, positive, and significant influence on flight security at Sultan Babullah Ternate Airport. The analysis revealed that Avsec performance accounts for 72.1% of the variance in the level of flight security. This confirms that enhancing the performance of Avsec personnel through improved training, strict SOP adherence, and attention to human factors is a critical strategy for ensuring and improving flight security.

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