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The effect of safety risk management and airport personnel competency on aviation safety performance

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Aviation safety performance at Wamena Indonesia airport is still relatively low, and this is shown by the high number of accidents that occurred at the airport in the 2013-2018 period, namely 20 accidents. The low performance of flight safety at Wamena airport is suspected to be related to the lack of optimal implementation of safety risk management and the competence of airport staff that still needs to be improved. The study aimed to determine the effect of safety risk management and airport personnel competence on flight safety performance at Wamena airport in eastern Indonesia. The research was conducted using a quantitative approach involving some respondents from airport staff and as many as 60 officers. The results showed that there was a significant direct effect of safety risk management on the flight safety performance of 79.8%; there is a significant direct effect of airport personnel competence on flight safety performance by 81.8%; there is a significant direct effect of airport personnel competence on safety risk management of 98.1%; there is a significant direct effect of safety risk management and the competence of airport personnel simultaneously on flight safety performance by 96% and based on research results show that indirectly safety risk management has an influence on flight safety performance through airport personnel competence of 97.7%.

1. Introduction

Air transportation plays a very important role in Indonesia's national economy, and one example is Wamena airport. Wamena Airport is a distribution route for the goods needed by the residents of Wamena and residents who inhabit the areas around Wamena. Wamena Airport is the only link between the Jayawijaya region and Jayapura and other expansion districts like Lanny Jaya, Yahukimo, Tolikara, and others. All materials needed by the community in Jayawijaya for daily basic needs and building materials are transported by plane. Wamena Airport is located in Jayawijaya district, Papua Province, located at an altitude of 1,550 meters above sea level and is 3,565 km from Jakarta. With a fairly high elevation position and located in a mountainous area, Wamena airport has unique weather and climate characteristics, where weather and climate changes are very dynamic. The movement of aircraft at Wamena airport is quite high and varies from the STOL propeller Code 1 A-class (typical of the smallest type PC-6) to the Jet Code 4C Class (Medium Jet: B-737-200/300) and Rotary Wing (Helicopter). The high movement of air traffic at Wamena airport goes hand in hand with the high number of aviation accidents. According to the National Transportation Safety Committee of the Republic of Indonesia (KNKT), from 2013 - to 2018, there were 20 flight accidents, both accidents, and incidents that occurred at Wamena airport, dominated by cargo planes on the Sentani -

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Wamena route. Based on the results of the flight safety audit at Wamena airport in 2015, it was found that the number and competence of personnel at Wamena airport were not following the operational needs of class I airports. KNKT (2019) stated that nearly 70% of aviation accidents in Wamena were caused by human error. This refers to the competence of flight personnel,

These findings also indicate that the cause of accidents that have occurred so far is due to flight safety procedures that have not been carried out properly in the field, where this is closely related to safety risk management and the competence of airport flight personnel in understanding and implementing safety procedures in every flight operation.

2. Literature Review

2.1. Aviation Safety Performance

Aviation safety performance is the result of work in quality and quantity achieved by an organization in carrying out its functions from all components of the flight operating system so that it can create a sense of security without danger by maintaining or reducing the risk of flight accidents through compliance with infrastructure, regulations, and aviation safety standards as requirements (Susanto et al., 2020; Remawi et al., 2011). Minimum flight activity and Regulations (SKEP/91/V/2007 concerning Airport Performance Assessment, 2007). The main source of aviation safety and safety risk management comes from the safety management system (SMS) regulated by ICAO, which every aviation stakeholder must implement. Aviation safety is the main requirement in the air transportation industry that must be adhered to and implemented and possible by every airline. However, flight safety requirements in an airline are also very closely related to the safety system on the part of the civil aviation authority, airports, air traffic controllers, ground handling, aircraft maintenance workshops, meteorological agencies, and concerns the understanding of the public in this case represented by the flight attendants. Users of air transportation services, so the aviation industry's safety system is unique because it depends on the safety and security culture of a nation as a whole (Alves et al., 2019; Sadi-Nezhad, 2021).

In Law of the Republic of Indonesia Number 1 of 2009 concerning Aviation (2009) Article 1, Paragraph 48 states that flight safety is a condition where safety requirements are met in the use of airspace, aircraft, airports, air transportation, flight navigation, as well as supporting facilities and other public facilities. Refers to the Regulation of the Minister of Transportation No. KM 8 of 2010 concerning the National Aviation Safety Program,(2010) as well as Doc 9859 Safety Management Manual (2018), which describes the eight units needed to implement the national aviation safety program and safety management system, including the commitment of the highest leadership, an effective safety reporting system, the use of information, learning, sharing experiences, training, standard procedures, and continuous improvement. In the rules SKEP/91/V/2007 concerning Airport Performance Assessment (2007), Article 1 states that an airport performance assessment will be carried out for every operated airport, consisting of safety aspects, security, and service. Furthermore, the scope of assessing airport safety, security, and service includes procedures, equipment/facilities, and personnel to guarantee flight safety at the airport.

Reason et al. (2006) illustrate the process of the accident by illustrating pieces of Swiss cheese. The layers of cheese describe the things involved in a safety system, while the holes in each layer indicate weaknesses that can cause accidents. There are 4 (four) layers that make up the occurrence of an accident, namely: (1) Organizational Influences (the relationship between organization and management policies in the occurrence of an accident); (2) Unsafe Supervision (supervision that is not good); (3) Precondition for Unsafe Act (conditions that support the emergence of the unsafe act); (4) Unsafe Act (unsafe behavior or actions that are carried out and are directly related to the occurrence of accidents).

2.2. Safety Risk Management)

Safety risk management (*safety risk management)* is the implementation of management functions comprehensively and systematically in risk management, especially regarding the risks faced by the organization (Distefano & Leonardi, 2014; Annex 19 Safety Management, 2013). In Doc 9859 Safety Management Manual (2018) and Annex 19 Safety Management (2013). There are four components and 12 elements that represent the minimum requirements for the implementation of a Safety management system (SMS), which includes certain sub-processes, certain tasks, or tools in the management system. The following are components and elements of a Safety management system (SMS): components of safety objectives and policies, components of safety risk management, components of safety assurance, and components of safety promotion.

2.3 Airport Personnel Competence

Airport personnel competence is a combination of knowledge, skills, and attitudes possessed by each individual that is inherent in his behavior in carrying out tasks and work in the workplace, in this case at the airport, following predetermined standards to obtain the desired result that is desired. Reflected in habits and actions (Lin, 2012; Regulation of the Minister of Transportation No. KM 8 of 2010 concerning the National Aviation Safety Program, 2010; Regulation of the Director-General of Civil Aviation Number: KP 622 of 2015, 2010). In the following, the authors describe some of the results of previous research that are relevant to the research conducted, among others: Distefano and Leonardi (2014), Xianfeng and

Shenguo (2012), Lin (2012), Rose (2006), Remawi et al. (2011), Melissa et al. (2017), Pahala et al. (2021), and Ricardianto et al. (2022). Research conducted by Distefano and Leonardi (2014) regarding the Risk Assessment Procedure for Civil Airports, safety risk assessment is defined as the systematic identification and evaluation of risks posed by a full spectrum of possible accident scenarios. Risk assessment is a tool that supports decision-making and therefore supports safety risk management. Safety risk management consists of hazard identification, risk assessment, and mitigation supporting airport operations. From the results of his research, it can be concluded that safety risk management is closely related to the safety performance of an airport. Research conducted by Xianfeng and Shenguo (2012) entitled Airport Safety Risk Evaluation Based on Modification of Quantitative Safety Management Model, concluded that applying a public airport safety management model based on performance and safety management would produce something that helps accurately understand the main problems in aviation safety management. Civilian airports and reasonably evaluate the sources of risk and the level of risk to the safety of civil airports. There are several main indicators in evaluating airport safety performance indicators, including the competence of personnel, facilities and equipment, and the environment.

Modeling the Important Organizational Factors of Safety Management System Performance (Lin, 2012). While safety culture has become a major focus of safety management, another related and nuanced factor, namely identifying employee organizations, has been overlooked in the aviation industry by comparison. Much of the literature tends to conceptualize organizational identity as a cognitive construct, in particular, as an individual and organizational value fit claiming that reflecting on an organization's identity embeds that identity in the organizational culture by triggering or leveraging its members' assumptions and deeply held values (Pratt, 1998; Riketta, 2005; Hatch & Schultz, 2003; Virgiawan et al. 2021). When organizational members reflect on their identity, they do so concerning their organizational culture, instilling their reflection in a tacit understanding of the culture (Hatch, 1983; Hatch & Schultz, 2003; Hapsari et al., 2021). The study concludes that organizational identity and personnel competence, safety culture, and safety management are important factors in airport safety performance. Empirical results in this study obtained using path model analysis indicate that loyalty and competence of personnel have a positive effect on safety regulations and individual safety responsibilities, including safety culture, and positively affect airport safety performance. Research by Rose (2006) the entitled Measuring Operational Safety in Aviation concluded that operational safety indicators remain at the forefront of operational decisions. The most widely available source of such risk data is incident reporting within the organization, but such reporting is subject to many stresses and variations. These stresses and variations mean that the best data is only a partial view of operating safety, but with careful management and monitoring, it can be used as a reasonable risk sample. Ultimately, the greatest value in collecting safety data is using it to reduce the likelihood of an accident or serious incident, and hence, any action that stems from it should serve this purpose. Remawi et al. (2011) in the Relationship between the Implementation of a Safety Management System and Employees' Attitudes towards Unsafe Acts in Aviation. This study took samples at Sharjah Airport, revealing that introducing the Safety Management System will affect employee attitudes and performance in creating aviation safety. Overall, the results of this study support the hypothesis that the introduction of SMS will affect employee attitudes towards flight safety. Safety culture has become a global concept in representing an aviation safety guarantee. There are five main components in a safety culture: organizational commitment, management involvement, employee empowerment, reward system, and reporting system.

The results of the latest research conducted in Indonesia by Melissa et al. (2017) concerning the implementation of the Safety Management System and Competency of Aviation Traffic Guidance states that the implementation of a good SMS can make it easier for an organization to identify safety hazards, ensure the implementation of corrective actions needed to maintain safety performance, provide for continuous monitoring and assessment. Routine safety performance and continuous improvement of the overall performance of the safety management system. Likewise, suppose you want to improve flight safety. In that case, the company's management needs to evaluate and develop the competence of flight traffic guides optimally and sustainably for each aviation traffic guide personnel by taking into account aspects of aviation traffic guides' competence, consisting of knowledge and attitudes.

2.4. Hypothesis

The research hypothesis is formulated as follows:

H_1: *There is a direct influence of risk management on flight safety performance at Wamena airport.*
H_2: *There is a direct influence on airport personnel competence on flight safety performance at Wamena airport.*
H_3: *There is a direct influence on airport personnel competence in safety risk management at Wamena airport.*
H_4: *There is a direct influence on safety risk management and the competence of airport personnel simultaneously on flight safety performance at Wamena airport.*
H_5: *There is an indirect influence on safety risk management on flight safety performance through the competence of airport personnel at Wamena airport.*

3. Research Methods

This research was conducted with a quantitative approach. The population in this study is all staff involved in the operation of Wamena airport, an airport located in the eastern part of Indonesia, precisely located in the province of Jayawijaya, Papua, an area consisting of mountains with an altitude between 1,500 to 5000 meters above sea level. . The entire population was sampled (saturated sample) of 60 people consisting of eight divisions with the following composition: 5 structural staff, 7 administrative/administrative staff, 6 service personnel, 4 large equipment, movement apron control (AMC) as many as 3 people, buildings and runways as many as 11 people, quick reaction handling of fire fighting as many as 12 people, and aviation security as many as 12 people.

The main data collection method is using a questionnaire that has been designed in such a way according to the rules of quantitative research based on latent variables. Each question is equipped with a choice of answers with an ordinal scale using a Likert scale of 1-5. This study also conducted limited interviews and observations to complement the survey method. The study was conducted in 2019 before the Covid 19 pandemic. Data analysis method using Path Analysis with data processing using the help of IBM SPSS Statistical Data Editor. Path analysis is a method used in a causal model that has been formulated by researchers based on theoretical considerations and certain knowledge. Path analysis is useful for checking or testing the theorized causal model and not deriving the causal theory.

In Path Analysis, the effect of exogenous variables on endogenous variables can be direct and indirect effects, or in other words, path analysis takes into account the direct and indirect effects. Researchers use a model diagram called a research paradigm with the following research model.

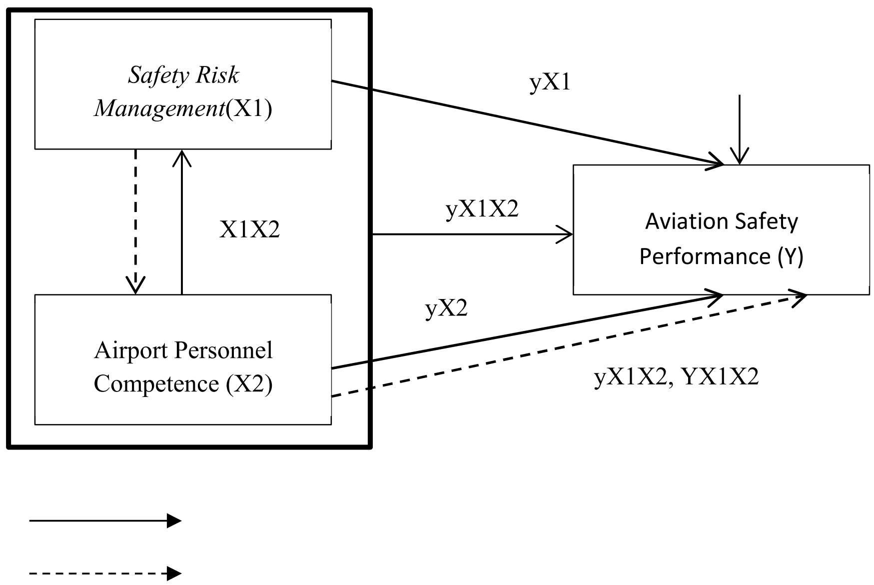

Fig. 1. Structural Model of Research with Path Analysis

4. Results and Discussion

4.1. Research result

In this study, the influence of safety risk management and airport personnel competence on flight safety performance is illustrated in Fig. 2.

Data on Safety Risk Management (X1) shows that the theoretical range is between 10 – 50. The answers given are in the range of 34 – 47, with 13. The description and measurement results of the Safety Risk Management variable are as follows:

Table 1
Description of Safety Risk Management Variables

Variable	Dimension	Average Score per Indicator	Average Score per Dimension
Safety Risk Management	Hazard identification	▪ Hazard reporting system: 3.95	4.00
	Safety risk assessment	▪ Risk level criteria: 3.87	4.09
Safety Risk Management Variable Average Score			**4.05**

Based on Table 1, several main indicators significantly influence the safety risk management variable, namely documentation and reporting; risk control strategy; implementation of risk management; and risk assessment. From the results of data analysis, it was obtained that the average score was 40.45; standard deviation or standard deviation of 3.005; median of 40.50; and mode of 40,543. The number of classes is 7, and the class length is 2. The results of data processing are shown in the following frequency distribution table.

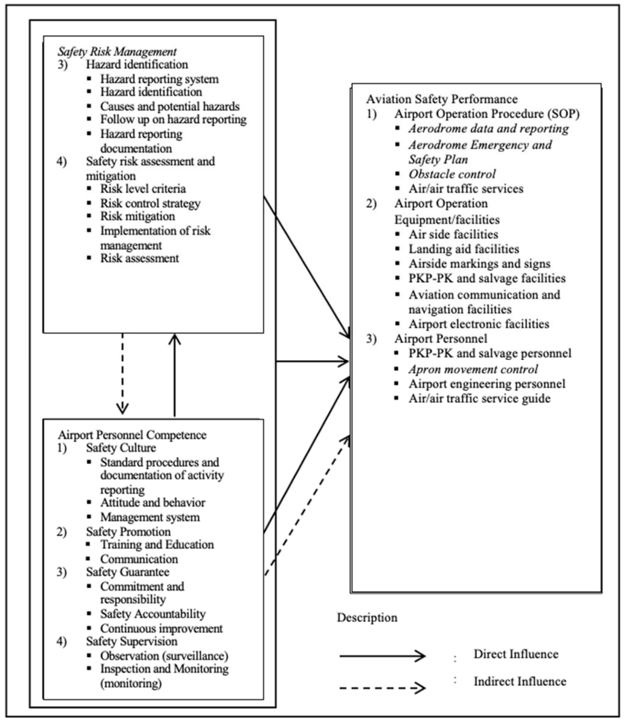

Fig. 2. Research Paradigm

Table 2
Frequency Distribution of Safety Risk Management Score

Number	Class Interval	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency
1	34 – 35	4	6.67	4
2	36 – 37	5	8.33	9
3	38 – 39	10	16.67	19
4	**40 – 41**	**22**	**36.67**	**41**
5	42 – 43	11	18.33	52
6	44 – 45	4	6.67	56
7	46 – 47	4	6.67	60
Amount		60	100	

Based on the mean value of 39,817, which is located in the class interval 38 – 40, it can be seen that 25 respondents (35%) of airport personnel competencies have the same score as the average, and 25 respondents (41.66%) are below the average and 14 respondents (23 .34%) above average. The competence of airport personnel is stated in Variable (X2). The following is a tabulation of each variable description, frequency tabulation, and histogram to illustrate the recapitulation of the calculation results.

Table 3
Description of Airport Personnel Competence Variables

Variable	**Dimension**	**Average Score per Indicator**	**Average Score per Dimension**
Airport Personnel Competence	Safety Culture	▪ Standard procedure and documentation of activity reporting: 3.90 ▪ Attitude and behavior: 3.87 ▪ Management system: 3.92	3.89
	Safety Promotion	▪ Training and Education: 4.05 ▪ Communication: 3.93	3.99
	Safety Guarantee	▪ Commitment and responsibility: 3.80 ▪ Safety accountability: 4.00 ▪ Continuous improvement: 3.97	3.92
	Safety Supervision	Observation (surveillance): 4.15 Inspection and Monitoring (monitoring): 4.23	4.19
Average Score of Airport Personnel Competence Variables			3.99

Table 4
Frequency Distribution of Airport Personnel Competency Score

Number	Class Interval	Absolute Frequency	Relative Frequency (%)	Cumulative Frequency
1	32 – 34	4	6.67	4
2	35 – 37	8	13.33	12
3	**38 – 40**	**25**	**41.67**	**37**
4	41 – 43	15	25.00	52
5	44 – 46	5	8.33	57
6	47 – 49	3	5.00	60
Amount		60	100	

Variable (Y) represents flight safety performance. The following is a tabulation of the variable description, frequency tabulation, and histogram to illustrate the recapitulation of the calculation results. Based on the Y variable data, it shows that the theoretical range is between 14 – 70. The answers given are in the range of 47 – 67, with 20. Several main indicators have a significant influence on the Aviation Safety Performance variable, namely flight/air traffic services; airside facilities; airside markings and signs; PKP-PK and salvage facilities; flight navigation and communication facilities; airport electronics facilities; PKP-PK personnel; as well as flight/air traffic service guides.
From the results of data analysis, it was obtained that the average score was 56,267, a standard deviation or standard deviation of 4.092, the median is 56,438, and the mode is 56.10. The number of classes 7 and the length of class 3. Based on the mean value of 56.267, which is located in the interval class 56 – 58, it can be seen from 16 respondents (26.67%) that the Aviation Safety Performance score is the same as the average, 25 respondents (41.66%) below average, and 19 respondents (31.67%) above the average.

Analytical Requirements Testing

To use path analysis in hypothesis testing, it is necessary to first test the statistical prerequisites for the data. The analysis prerequisite tests include: 1) Data normality test; 2) Test the homogeneity of variance for each related variable; and 3) Test for linearity and significance of regression and correlation. Data Normality Test. Normality testing for each research variable was carried out using the Kolmogorov-Smirnov test. The calculated KS price results are consulted with the KS table on the significanceα= of 0.05 and 0.01 if the data is declared normally distributed if the calculated KS price is less than the Table KS. The statistical normality test criteria can be written as follows:

H_0: *Normally distributed.*
H_1: *Not normally distributed.*

Table 5
Data Normality Test Resume

One-Sample Kolmogorov-Smirnov Test		
		Unstandardized Predicted Value
N		60
Normal Parameters[a,b]	Mean	56.2500000
	Std. Deviation	4.04434237
	Absolute	.104
	Positive	.079
	Negative	-.104
Test Statistic		.104
Asymp. Sig. (2-tailed)		.165[c]

a. Test distribution is Normal.
b. Calculated form data.
c. Lilliefors Significance Correction.

The table above shows that data on flight safety performance, safety risk management, and airport personnel competence come from a normally distributed population. Due to the fulfillment of normality conditions, path analysis can be carried out. Homogeneity of Variance Tests. From the results of the homogeneity test calculation using the Levene method for each variance of safety risk management (X1) and airport personnel competence (X2) on flight safety performance (Y), the following results are obtained:

Table 6
Homogeneity Test Resume

Variable	Sig.
Safety Risk Management	0.114
Airport Personnel Competence	0.612

From the results of these calculations, the variance of safety risk management (X1) obtained a significance value of 0.114 > 0.05. It can be said that the variance of safety risk management (X1) and flight safety performance (Y) comes from the same population (homogeneous). As for the variance of airport personnel competence (X2), a significance value of 0.612 > 0.05 was obtained. It is said that the variance of airport personnel competence (X2) and flight safety performance (Y) came from the same population (homogeneous). The results of the homogeneity test of the data indicate that the research data comes from a population that is normally distributed and has a homogeneous variance. Thus, the data homogeneity requirements are met.

Linearity Test. From the results of the calculation of the homogeneity test using the Levene method for the relationship between the variance of safety risk management (X1) and flight safety performance (Y); airport personnel competence (X2) with flight safety performance (Y); and airport personnel competence (X2) with safety risk management (X1), the results are as follows:

Table 7
Linearity Test Resume

Track	Connection	Sig. (linearity)
X1Y	*Safety Risk Management**Flight Safety Performance	0.517
X2Y	Airport Personnel Competence *Aviation Safety Performance	0.702
X2X1	Airport Personnel Competence *Safety Risk Management	0.488

Based on the results of the linearity test calculations above, the following conclusions can be drawn:

- From the X1Y relationship, it is known that the value of Sig. Deviation from linearity is 0.517 > 0.05, and it can be concluded that there is a linear relationship between safety risk management and flight safety performance.
- From the X2Y relationship, it is known that the value of Sig. Deviation from linearity is 0.702 > 0.05, and it can be concluded that there is a linear relationship between the competence of airport personnel and flight safety performance.
- From the X2X1 relationship, it is known that the value of Sig. Deviation from linearity is 0.488 > 0.05, and it can be concluded that there is a linear relationship between the competence of airport personnel and safety risk management.

The results of the linearity test of the data indicate a linear relationship between each variable. Thus, the data linearity requirements are met. Multicollinearity Test. Based on the multicollinearity test calculation results, it is known that the Tolerance value is 0.109 > 0.10, and the VIF value is 2.908 < 10. It can be concluded that there is no multicollinearity on the influence of Safety Risk Management and Airport Personnel Competence on Aviation Safety Performance. Thus, the data multicollinearity requirements are met.

Table 8
Multicollinearity Test Resume

Coefficients	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model	B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1 (Constant)	5.028	2012		2,499	.015		
Safety Risk Management	.673	.265	.486	2,542	.014	.109	2,908
Airport Personnel Competence	.602	.233	.496	2,590	.012	.109	2,908

Autocorrelation Test. Based on the Durbin-Watson autocorrelation test, the d value was 1.581. The values for dl and du are obtained from the Durbin-Watson Table, where for n: 60 and k: 2, the values for dl: 1.351 and the value of du: 1.484.

Table 9
Autocorrelation Test Resume

d	dl	du	4-dl	4-du
1,581	1.351	1.484	2,649	2,561

From the calculation results obtained a value of du: 1.484 < d: 1.581 < 4-du: 2.561, it can be concluded that there is no autocorrelation between the influence of safety risk management and airport personnel competence on flight safety performance. Thus, the data autocorrelation requirements are met.

Heteroscedasticity Test

Based on the results of the Geljser heteroscedasticity test, the following results were obtained:

Table 10
Heteroscedasticity Test Resume

Variable	Sig	Conclusion
Safety Risk Management(X1)	0.243	There is no heteroscedasticity
Airport Personnel Competence (X2)	0.557	There is no heteroscedasticity

Path Analysis

A structural equation or structural model, if each dependent/endogenous variable (Y) is uniquely determined by a set of exogenous/independent variables (X). Furthermore, the image that demonstrates the causal relationship structure between variables is called a path diagram. Systematically, path analysis follows the pattern of the structural model, so the first step to working on or implementing the path analysis model is to formulate structural equations and path diagrams (Path Diagrams).

Linear Regression Equation

In connection with this study, there are two independent variables, namely safety risk management (X1) and airport personnel competence (X2), and one dependent variable is flight safety performance (Y), so to find the path equation, multiple linear regression will be used. Multiple regression analysis aims to determine whether or not there is an effect of two or more independent variables (X) on the dependent variable (Y).

Table 11

Calculation of Linear Regression X1, X2, and Y

Variable	B	*β*	T count	Sig.	R	Square	F
Safety Risk Management	5.028		2,499	.015	.980	.960	684,099
Airport Personnel	.673	.486	2,542	.014	893	.798	229,449
Competence	.602	.496	2.509	.012	.905	.818	260,995

The analysis results presented in Table 11 obtained a value of 0.980, explaining the very strong/perfect correlation (relationship) between risk management and airport personnel competence on flight safety performance. The R square value of 0.960 or 96% explains the effect of *safety risk management* and competence of airport personnel on flight safety performance is 96%. Meanwhile, for the value of e, it is obtained that e = (1-0.96) of 0.2

The regression equation model between X1, X2 to Y from the calculation results, obtained:

- Constant Value (a): 5.028
- Value of b1 : 0.673 and b2 : 0.602

So the equation Y = a + b1 X1 + b2 X2 is Y = 5.028 + 0.673 X1 + 0.602 X2

Can be interpreted :

- The constant of 5.028 means that the consistent value of the Y variable is 5.028.
- The regression coefficient for X1 is 0.673, and X2 is 0.602. The regression coefficient is positive, so it can be said that the direction of the influence of the variables X1 and X2 on Y is positive.

T-test

- If the value of sig < 0.05 or T-count > T-table then there is an effect of variable X on Y
- If the value of sig > 0.05 or T-count < T-table, then there is no effect of variable X on Y
- T-table = t(a/2 ; nk-1) = t(0.025 ; 57) = 2.002

F-test

- If the value of sig < 0.05 or F arithmetic > F table then there is an effect of variable X simultaneously on Y
- If the value of sig > 0.05 or F count < F table, then there is no effect of variable X simultaneously on Y
- Ftable = F(k ; nk = t(2 ; 58) = 3.1
- Decision making in the regression test X1, X2 against Y:
- Based on a significance value of 0.014 <0.05, it can be concluded that the X1 variable affects the Y variable.
- Based on the calculated t value of 2.542 > t table of 2.002, it can be concluded that the X1 variable affects the Y variable.
- Based on a significance value of 0.012 <0.05, it can be concluded that the X2 variable affects the Y variable.
- Based on the calculated t value of 2.509 > t table of 2.002, it can be concluded that the X2 variable affects the Y variable.
- Based on the calculated F value of 684,099 > F table, it can be concluded that the X1 and X2 variables simultaneously affect the Y variable.

Meanwhile, to get the value of the linear regression equation of the relationship between X2 and X1, a simple linear regression method was used with the result as follows :

Table 12
X2 and X1. Linear Regression Calculation Results

Model	B	β	T count	Sig.	R	Square	F
(Constant)	1,279		.553	.583	.990	.981	293.634
Airport Personnel Competence	.970	.914	17.136	.000			

The results of the analysis presented in the Table above obtained an R-value of 0.990, this explains the magnitude of the correlation (relation) is very strong/perfect between the competence of airport personnel in safety risk management. The R-square value of 0.981 or 98.1% explains the effect of airport personnel competence on safety risk management is 98.1%. From the results of table 4.14, it is found that the calculated F value is 293.634 with a significance level of 0.000 <0.05, then the regression model can be used to predict the X1 variable, or in other words, there is an effect of the X2 variable on X1 variable.

The regression equation model between X2 and X1 from the calculation results obtained:

- Constant Value (a): 1.279
- B value : 0.970

So the equation X1 = a + b X2 obtained is X1 = 1.279 + 0.970 X2
Can be interpreted :

- The constant of 1.279 means that the consistent value of the X1 variable is 1.279
- The X2 regression coefficient of 0.970 states that for every 1% addition to the X2 value, the X1 value increases by 0.970. The regression coefficient is positive, so it can be said that the direction of the influence of the X2 variable on X1 is positive
- Decision making in the X2 to X1 regression test:
- Based on the significant value of 0.000 <0.05, it can be concluded that the X2 variable affects the X1. variable
- Based on the t-count value of 17.136 > t-table of 2.002, it can be concluded that the X2 variable affects the X1 variable.

Next is the correlation coefficient, which is a coefficient that states the level of relationship contribution obtained based on field data, after going through correlation testing with the results arranged in the form of a matrix as follows:

Table 13
Resumes of Intervariable Path Coefficient Values

Track	Path Coefficient	Path Coefficient Value
X1Y	yx1	0.486
X2Y	yx2	0.496
X2X1	x2x1	0.914
X1X2Y	yx1x2	0.982

The correlation matrix and path coefficients between variables as presented in table 13 above can be presented in a structural model as shown in the following figure:

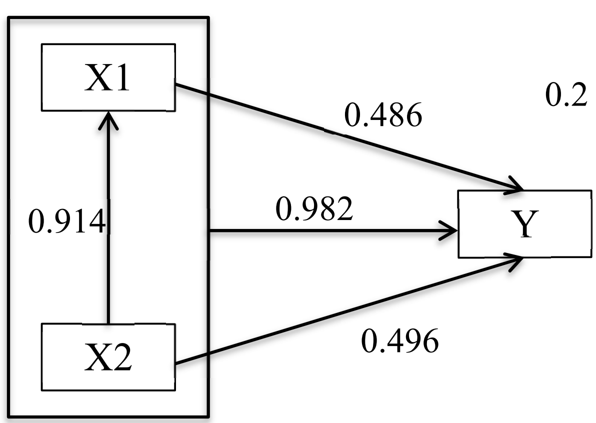

Fig. 3. Structural Relationships Between Variables

From the hypothesized model, it can be stated that all paths are significant for flight safety performance, as presented in Table 13, which provides details of the results of the calculation of the path coefficients.

First Hypothesis Test

The first hypothesis states that "Safety Risk Management (X1) has a direct effect on Aviation Safety Performance (Y)".

H_0: yX1 = 0

H_1: yX1 > 0

The results of the calculation of the path coefficient for the hypothesized causal model obtained the path coefficient value yX1 = 0.486 with R-Squre of 0.798; t-count = 2,542 and t-table = 2,002 at = 0,05. The path coefficient is significant because t-count > t-table is significant, so H0 is rejected. The first hypothesis is proven that the Safety Risk Management variable directly affects the Aviation Safety Performance variable.

Second Hypothesis Test

The second hypothesis states that "Airport Personnel Competence (X2) has a direct effect on Aviation Safety Performance (Y)".

H_0: yX2 = 0

H_1: yX2 > 0

The results of the calculation of the path coefficient for the hypothesized causal model obtained the path coefficient value yX2 = 0.496 with R-Square of 0.818; t-count = 2,509 and t-table = 2,0002 at = 0.05. The path coefficient is significant because t-count > t-table is significant, so H0 is rejected. The second hypothesis is proven, that the Airport Personnel Competence variable has a direct positive effect on the Aviation Safety Performance variable.

Third Hypothesis Test

The third hypothesis states that "Airport Personnel Competence (X2) has a direct effect on Safety Risk Management (X1)".

H_0: X2X1 = 0

H_1: X2X1 > 0

The results of the calculation of the path coefficient for the hypothesized causal model obtained the path coefficient value X2X1 = 0.914 with R-Square of 0.981; t-count = 17.136 and t-table = 2.002 at = 0.05. The path coefficient is significant because t-count > t-table is significant, so H0 is rejected. The third hypothesis is proven, that the Airport Personnel Competence variable has a direct positive effect on the Safety Risk Management variable.

Fourth Hypothesis Test

The fourth hypothesis states that "Safety Risk Management (X1) and Airport Personnel Competence (X2) together have a direct effect on Aviation Safety Performance (Y)".

H_0: yx1x2 = 0

H_1: yx1x2 > 0

The results of the calculation of the path coefficient for the hypothesized causal model obtained the path coefficient value yX2X1 = 0.982 with R-square of 0.960; t-count = 2,449; F-count = 684,099 and t-table = 2,002 at = 0.05. The path coefficient is significant because F-count > F-table is significant, so H0 is rejected. The fourth hypothesis is proven, that the variables of Safety Risk Management and Competence of Airport Personnel simultaneously have a direct positive effect on the Aviation Safety Performance variable.

Fifth Hypothesis Test

The fifth hypothesis states that "*Safety Risk Management*(X1) has an indirect effect on Aviation Safety Performance (Y) through the Airport Personnel Competence variable (X2) as an intervening variable”.

Based on the analysis results, the direct effect of X1 on Y is 0.486, while the indirect effect of X1 through X2 on Y is the multiplication of X1's beta against X2 with X2's Beta value of Y, which is 0.990 x 0.496 = 0.491. Then the total effect given by X1 to Y is the direct effect plus the indirect effect, namely: 0.486 + 0.491 = 0.977. Based on the calculation results, it is known that the direct influence value is 0.486 and the indirect effect is 0.491, which means that the indirect influence value is greater than the direct t affect value. These results indicate that X1 indirectly through X2 mediation significantly influences Y. The fifth hypothesis is proven, that the Safety Risk Management variable has a positive indirect effect on Aviation Safety Performance (Y) through the mediation of Airport Personnel Competence (X2). Overall, the results of a complete calculation using path analysis can be described as follows:

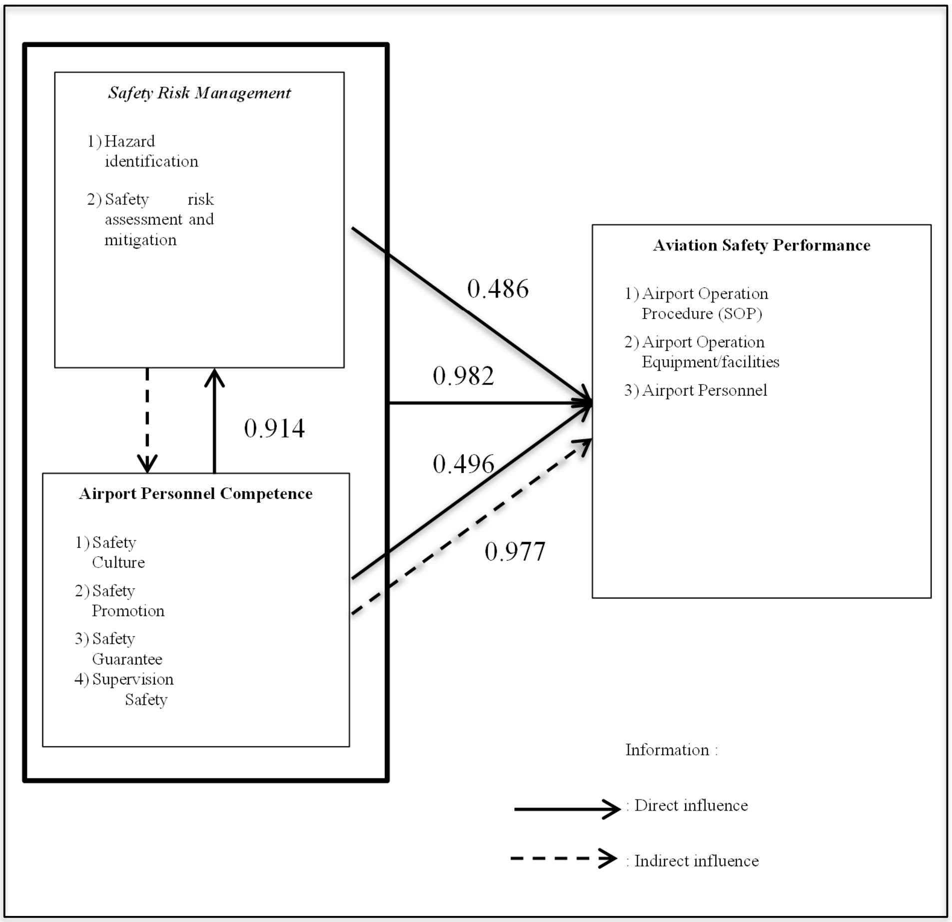

Fig. 4. Complete Calculation Results of Path Analysis

Research Findings Interview and Observation Results

From the results of in-depth interviews with key informants, the head of Wamena airport, and field observations, the following picture is obtained:

1. Hazard identification, assessment, and mitigation of safety risks are key in realizing flight safety performance following airport operating procedures.
2. The education and training of airport personnel greatly influence the implementation of safety risk management in the field.
3. Airport personnel who are directly involved in flight operations must create a guarantee of flight safety for service users.
4. Observation, inspection, and monitoring are one way to improve airport personnel's competence to understand and identify safety risks in flight operations at airports.
5. *Safety risk management* is not only for the leadership or some airport personnel but for all personnel involved in the operation of an airport, so it is necessary to implement appropriate risk management that can reach all levels.
6. The main benchmark in realizing good and positive flight safety performance must be supported by reliable operating procedures, equipment/facilities, and airport personnel and following flight safety standards that have been set both nationally through regulation of the Minister of Transportation, National Aviation Safety Program

Regulation of the Minister of Transportation No. KM 8 of 2010 concerning the National Aviation Safety Program (2010), internationally through(Annex 19 Safety Management (2013), and Doc 9859 Safety Management Manual (2018).

4.2. Discussion

The purpose of the study, namely to examine the influence of safety risk management and airport personnel competence on flight safety performance at Wamena airport in 2019. The research data analyzed empirically proves that safety risk management has a direct and significant effect on flight safety performance at the airport. Wamena airport by 79.8%. This shows that the safety risk management program created by the Wamena airport manager greatly determines the flight safety performance at Wamena airport. This study also empirically proves that the competence of airport personnel direct and significant effect on flight safety performance at Wamena airport by 81.8%. This shows that airport personnel who have reliable competence will determine flight safety performance at Wamena airport. Empirically this study also proves that the competence of airport personnel has a direct and significant effect on Safety Risk Management by 98.1%. Indicators in the competence of airport personnel significantly improve aspects of Safety Risk Management.

The results of this study also prove a direct and significant effect of safety risk management and airport personnel competence on flight safety performance at Wamena airport by 96%. The basic principle for implementing an aviation safety system is the safety culture of every aviation personnel or organization working in the system. Finally, in line with the three findings above, the results of this study empirically also prove that safety risk management indirectly affects flight safety performance at Wamena airport through the variable competence of airport personnel by 97.7%. This indicates that the safety risk management program run well by all levels of employees and leaders at Wamena airport can improve the competence of airport personnel in terms of increasing safety assurance, which has implications for better flight safety performance at Wamena airport.

5. Conclusion

Based on the results of research and discussion, it can be concluded as follows:

1. There is a significant direct effect of safety risk management on flight safety performance. The main indicators of safety risk management, including documentation and reporting of activities; risk control strategy; implementation of risk management; and risk assessment, greatly affects the level of flight safety performance to create a sense of security without danger by maintaining or reducing the risk of flight accidents in every flight operation.
2. There is a significant direct influence of airport personnel competence on flight safety performance. The main indicators of the competence of airport personnel, including training and education; safety accountability; observation; and inspection and monitoring of work, greatly affect the level of flight safety performance, which is reflected in the habits and actions of every airport personnel in carrying out their main duties and daily functions.
3. There is a significant direct influence on the competence of airport personnel in safety risk management. A comprehensive and systematic safety promotion, assurance, and supervision program to improve airport personnel's competence have proven to support the implementation of safety risk management at airports.
4. There is a significant direct influence on safety risk management and the competence of airport personnel simultaneously on safety performance. The main indicators for each variable, including hazard identification, safety risk assessment and mitigation, safety promotion, safety assurance, and safety supervision, greatly affect the level of Aviation Safety Performance at an airport to create and produce airport operating procedures that guarantee aviation safety.
5. There is a significant indirect effect of safety risk management on flight safety performance through the competence variable of airport personnel as an intervening variable. Effective safety management requires a common understanding of the responsibilities and contributions of governments and aviation service providers. Safety management can be considered a management process that must be carried out at the same level and in conjunction with other processes at the highest management level. Because safety management is one of the management processes, every part of the organization, especially at the highest management level, must have a safety person in charge. Safety is an inherent part of every procedure, product, etc.

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