THE INFLUENCE OF GROUND TIME TO DOMESTIC FLIGHTS TOWARD FLIGHT DEPARTURE TIME

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ABSTRACT
Sultan Aji Muhammad Sulaiman Sepinggan Airport in Balikpapan is one of the busiest airports on the island of Kalimantan, connecting airports in central Indonesia. Domestic aircraft activity at this airport decreased after the Covid-19 pandemic. Give each airline enough time to prepare for the next flight to depart. Ground time refers to the aircraft that has been grounded. Too much time on the ground will delay flight departure. This study aims to determine the effect of ground time on the punctuality of flight departures. Research techniques used quantitative research methods and data from literature reviews, linear regression analysis and interviews. The authors' findings suggest that the ground time of Indonesian airlines has an effect on flight departure speeds at Sultan Aji Muhammad Sulaiman Sepinggan Airport in Balikpapan. The t-test's t-count is 2,527, which is higher than the t-table's 2.3060, indicating that ground time has a significant effect on on-time departures. In the coefficient of determination test, variable Y explained 51.5% of the variable X, the remaining 48.5% could not be explained by other independent variables. Ground weather variables such as aircraft type, weather conditions, staff activity, and aircraft capacity also have an impact. Discuss optimization of trucking operations.

Keywords: *block off, block on, ground time, departure.*

1. INTRODUCTION

Sultan Aji Muhammad Sulaiman Airport (SAMS) Sepinggan Balikpapan is an airport managed by PT. Angkasa Pura I. One of the airports that is quite busy because it is a destination and transit for passengers who will carry out business and leisure activities in the Kalimantan region. When ground time, operational services are ensured not to exceed the time it should be because it will affect the delay in departure hours. So the flight to the next route becomes delay and lowered on time performance from an airline.

Based on the total movement of air transport traffic PT. Persero Angkasa Pura I Sultan Aji Muhammad Sepinggan International Airport Balikpapan that the number of passengers arriving in 2023 was 1,022,436 passengers with a total of 18,669 arriving aircraft. This indicates that the flight flow at SAMS Sepinggan Balikpapan Airport is quite busy. This is used as a factor to carry out flight operations in accordance with schedule which has been set. If there are problems in its implementation, it can affect existing flights. The intended constraints include the weather factor, the factor of checking the time fleet on the ground, and the delay in landing at the Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan.

To anticipate this, the airport management needs to review it again ground time an airplane. It is intended to optimize ground time airline to departure time.

Ground time is the length of time used by the aircraft while on the apron, starting from time block on until block off which is where the ramp service process takes place [1]. This time is used by the plane to perform refueling, Checking the condition of the aircraft, loading and unloading baggage, moving passengers, and changing the crew. What is meant by block on is when the aircraft stops in position parking stand determined by the AMC officer (Apron Movement Control). Whereas block off is the time during which the aircraft moves backwards from the position parking stand. From the IATA Conference in Geneva stated that ground time for flights with standard schedule for 1 hour 15 minutes, while the minimum time required for ground time for 55 minutes [2].

These ground durations include the core turnaround procedure, defined by Wu (2010, p. 64)

as the time between an aircraft's on-block and off-block time at a gate [3].

To enable optimal ground time, operational activities such as associated units, tools to assist operational activities, and personnel in these operational activities must be supported. Ground-handling trucks and equipment would provide assistance after aircrafts arrived at the port, apron, terminal, or other locations to prepare for the next flight [5]. Ground handling, according to EASA in [6] [7] the International Air Transport Association (IATA), is the complex series of operations required to separate an aircraft from its payload (passengers, baggage, cargo and mail) upon arrival and to combine with cargo prior to departure. Due to the unique nature of GSE vehicle operator work, it is critical that employment be preceded by meticulous professional selection, which includes an overall assessment of suitability for a position [8].

The flights studied were domestic flights from Indonesian airlines. Indonesian airlines include Garuda Indonesia, Citilink, Lion Air, Super Air Jet, Batik Air and Wings Air. All scheduled ground handling processes must be carried out in the exact order, on time, and with the highest safety standards. [9].

Flight departure begins when the aircraft has left the aircraft's parked position. Ground support services for transit flights are regularly delayed [10] [11] [12]. The scheduled flight postpone is decided primarily based totally at the time distinction among the scheduled departure or arrival time and the real departure or arrival time,

i.e. whilst the plane stops and leaves the apron. flight) or whilst the plane is stopped and parked withinside the apron on the vacation spot airport [13].

Due in part to the stability of infrastructure capacity, such as runways, taxiways, and total air traffic, since the push toward liberalizing air transport began in the 1970s and 1980s, the rise in air traffic has been accompanied by a continuous rise in passenger delays [14] [15]. Air pollution may cause flight delays or cancellations for two possible reasons [16].

Commercial flight delays are primarily caused by "weather" and "airspace restrictions." [17]. Intractable delays in air traffic develop as a result of an imbalance between expanding air traffic demand and restricted airspace capacity. [18]. During the COVID-19 epidemic, there was a significant drop in traffic demand, resulting in considerable reductions in traffic delays, energy consumption, and emissions [19].

Delays are a important point in air freight operations, which outsources the complex interactions that occur between airlines, airport operators, airport location coordinators, and service providers. aeronautical navigation service (ANSP) from the planning and programming stages to the day of operation [20]. Aircraft delays in airports, particularly commercial hub airports, usually spread to adjacent airports and potentially the entire air transportation network due to aircraft interconnectedness [21].

Airlines with dominating positions at destination airports face minimal competitive pressure to eliminate delays, although they may be concerned about the negative consequences delays have on their own flights [22]. Flight delays are a major issue for society since they affect airlines, transportation businesses, air traffic controllers, facility managers, and passengers [23].

The following research topics are derived from the previously given introduction.

1. Is there influence ground time Indonesian airlines regarding the timeliness of flight departures at Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan?
2. What are the factors that affect precisionground time ?
3. How to optimize operational activitiesground handling toground time ?

2. METHODS

Research methodology is an attempt to study and investigate a problem by using careful and thorough scientific techniques to collect, process, and analyze data, and systematically and objectively draw conclusions to solve problems or test hypotheses to gain knowledge that is beneficial to human life. The research method is a scientific approach for gathering data with specified goals and objectives in mind [24].

2.1 Research Design

Adapted research to the formulation of the problem and the research objectives to be reached. The following is the research plan that the author will use in doing research :

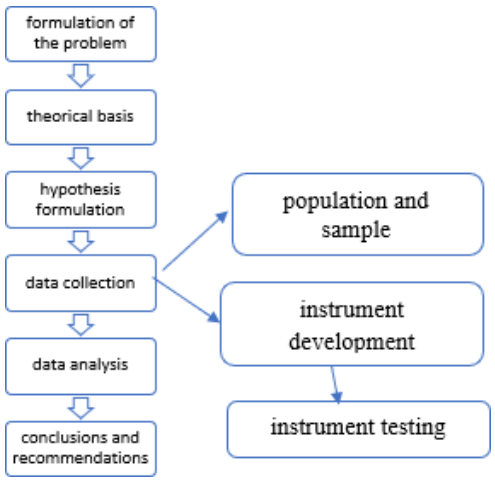

Figure 1. Quantitive Research Design [25]

2.2 Research Variables

The independent variable (X) and variable (Y) in this study are as follows.

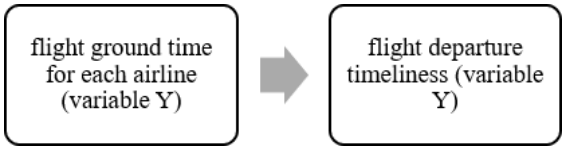

Figure 2. Research Variable

1. Variable X (Independent Variable) is a variable that influences other variables. This variable can also be referred to as stimulus, predictor, antecedent, and exogenous. This variable is named (X) in the study which is the average flight ground time for each airline.
2. Variable Y (Dependent Variable) is a variable that is influenced by an independent variable. This variable becomes the result of the existence of an independent variable. This variable is named (Y) in the study which is in the form of punctuality of flight departure.

2.3 Population, Sample, and Object

The population taken by the study was from domestic flights at SAMSS International Airport, Balikpapan. The sample used is ground time each airline during January 2023 to February 2023. And the object used during this research is the ground time and OTP of Indonesian scheduled commercial airlines at SAMSS Airport, Balikpapan.

2.4 Data Collection Techniques

The research employs data collecting approaches such as documentation analysis, interviews, and literature reviews.

2.5 Research Instruments

An instrument is a tool used to measure an object measure or collect from a variable [26]. In this case, the instrument has the meaning as a tool for obtaining and collecting research data, as a process for finding results and conclusions from research. In this final project research, the authors used a research instrument in the form of daily log Domestic flights to SAMSS Airport, Balikpapan, from January to February 2023.

2.6 Data Analysis Techniques

Descriptive quantification is the technique utilized in this study's textual analysis. According in [26] Descriptive study is research that aims to characterize a symptom, incident, or event that is now occurring. Meanwhile, the quantitative approach described by [27][28] indicates that this method is related to the use of numbers, beginning with data collection, data interpretation, and results.

3. RESULTS AND DISCUSSION

The information needed for this study originated from AMC tables. Quantitative data were analyzed by using basic linear regression analysis, partial test (t), and coefficient of determination were carried out using SPSS.

The outcomes of the regression analysis are the coefficients of the independent variables. In order to determine this coefficient's value and forecast the value of the dependent variable, an equation must be solved. The table below displays the findings of basic linear regression analysis.

Table 1. Simple Limear Regression Test Results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Say.
1	(Constant)	1277.163	466.524		2.738	.034
	X	-3.661	1.449	-.718	-2.527	.045

a. Dependent Variable: Y

The regression equation is obtained as follows from the table presented :

$$\mathbf{Y = 1277{,}163 - 3{,}661X + e} \qquad \mathbf{(1)}$$

If b is positive, the aforementioned adjustments are additions; otherwise, they are decreases. A constant of 1277.163 means that if the variable ground time is zero or fixed, it will raise the level of flight departure timeliness by 1277.163%, according to the coefficients of the basic linear regression equation above. The ground time variable 1277.163 shows that if the variableground time an increase of 1 unit will reduce the level of flight departure punctuality by 3,661 units or by 366.1%.

The inadequate capacity of the independent variable to explain the dependent variable is shown by the low coefficient of determination (R2). A number close to 1 indicates that the independent variable offers almost all the information required to predict and explain the dependent variable. If adjusted R2 is negative, it is deemed 0 (zero).

Table 2. Test Results for the Coefficient of Determination

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.718[a]	.515	.435	29.37206

a. Predictors: (Constant), X

b. Dependent Variable: Y

According to the model summary displaying the SPSS output above, R2 is 0.515. This demonstrates that 51.5% of the variation of the dependent variable is explained by the independent variable. The independent variables in this study model did not account for 48.5% of the variation of the dependent variable. Other influencing elements were, in fact, not looked at in this study. The t-statistic was applied to examine the impact of the independent factors on the dependent variables individually. The significant value of t that was calculated to symbolize this. The dependent variable is impacted by the independent factors individually if the significance value t is smaller than the significance threshold (0.05); otherwise, the independent variables have no effect on the dependent variable individually. The table below presents the key findings of the t-test:

Table 3. T test results

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	T	Say.
1	(Constant)	1277.163	466.524		2.738	.034
	X	-3.661	1.449	-.718	-2.527	.045

a. Dependent Variable: Y

The variable X has a significant value of 0.05 and t is 2,527, greater than that of the table t (2,3060), showing that the variable X has a substantial impact on Y, according to the findings of the significant parameters (t-test) shown in the table above. The ground time variable (X) has a considerable impact on the departure delay variable (Y), as seen in the table.

According to the conclusions of the interviews, factors determine time on the ground, among others:

a. aircraft type,
b. air side capacity,
c. Seasonal wind
d. Time of day
e. personnel capabilities ground handling

According to the findings of the interviews, optimization can be carried out in operational operations such as ground handling and ground time, among others:

a. personnel performance improvement ground handling which can work optimally,
b. process from ground handling like loading/unloading which can be improved but still prioritizing aviation safety and security, as well
c. ensure process pax boarding went smoothly and on time.

3. CONCLUSION

The following conclusions can be reached from the study and discussion mentioned above:

a. The timeliness of flight departures at SAMSS International Airport in Balikpapan, East Kalimantan, may be impacted by domestic flight ground timings for Indonesian carriers. The regression analysis's findings indicate that the ground time change (X) is fixed or zero, increasing the departure time on-time flight by 1277.163% and decreasing it by 3661 units, or 366.1%, if this variable increases by one unit. This regression constant was obtained at 1277,163, which indicates that the ground time change (X) is zero. According to the results of the coefficient of determination (R squared) of 0.515, the dependent variable (time on the ground) has a 51.5% correlation with the independent variable (on time at departure); the remaining 48.5% cannot be accounted for by any other factors considered in this study.

b. Influencing factors ground time including aircraft types, time of day, air side capacity, seasonal wind, and personnel competence ground handling.

c. Optimization of operational activities ground handling to ground time including increased personnel performance ground handling that can work optimally, the process of ground handling like loading/unloading which can be improved while still prioritizing aviation safety and security, as well as ensuring the process pax boarding went smoothly and on time.

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