

The Impact of Civil Enclave to the Commercial Flight at Halim Perdanakusuma Airport

Bunga Indira Adisatilana^{1*}, Dwi Citra Ramadhanti², Basri Fahriza³, Indra Yuzal⁴

^{1,2,3,4} Institut Transportasi dan Logistik Trisakti, Jakarta, Indonesia

*Corresponding author: bungaindira@gmail.com

Abstract. Halim Perdanakusuma Airport is one of the airports in the capital city of Indonesia, Jakarta. In addition to commercial scheduled flights, this airport is also used for military, private and presidential purposes. On January 10th, 2014, Halim Perdanakusuma began to serve domestic scheduled commercial flights to reduce the overloaded Soekarno-Hatta International Airport. Because of the expanding of travel demand from/to this capital city of Indonesia, limited airport capacities are expected to become more critical issues in the upcoming decades. currently the airport capacity already saturated and over capacity. considering that there is only one runway at Halim Perdanakusuma Airport and used together with Indonesia Air Force. This paper analysed the the potential of Halim Perdanakusuma Airport to be developed on responding the growing passenger demand toward commercial flight. The qualitative and quantitative methods are used in this research in order to explore the future number of passengers at Halim Perdanakusuma Airport.

1. Introduction

This kind of research previously existed with the title “Build Airport Capacity or Manage Flight Demand?” compiled by Megan S. Ryerson and Amber Woodburn. We would like to conduct similar research at Halim Perdanakusuma Airport which is no one has researched yet.

The airports have provided several operations to increase regional and national growth and airline business development. Despite capacity expansion, the demand for airport access has increased beyond the airport’s capacity. Therefore, with the increase in airport capacity, there will be a balance effect between airport demand and capacity. [1]

Halim Perdanakusuma Airport is one of the airports in special capital city of Indonesia, Jakarta. In addition to commercial scheduled flights, this airport is also used for military, private and presidential purposes. On January 10th, 2014, Halim Perdanakusuma began to serve domestic scheduled commercial flights in order to reduce the overloaded Soekarno-Hatta International Airport. Because of the expanding travel demand to/from Jakarta, limited airport capacity is expected to become more critical issues in the upcoming decades.

The problem is the airport capacity at Halim Perdanakusuma Airport has already saturated and over capacity considering that there is only one runway at Halim Perdanakusuma Airport which is used alternately with the Indonesian Air Force. From an operational point of view, airports have the ability to predict and improve performance if needed. [1] Airport demand management has an important capability to decrease flight delay, improve safety and reduce environmental impact. [2]

Many systems in airports are very complex. They need to manage infrastructure and services for the operations of aircraft and handling of passengers and cargo. These are the natural services that have many different parts, while the common thing is that these services have long lead times to plan and develop and are expensive to build and maintain. [3]

2. Method

The method which is used in This study is qualitative and quantitative. Mixed methods research is the class of research where the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study or set of related studies.

According to several prominent qualitative scholars (Creswell 2002; Pope & Mays 1995; Denzin & Lincoln, 1994) Qualitative Research is intended to deeply explore, understand and interpret social phenomena within its natural setting. By using a qualitative researcher methodology, researchers want to collect richer information and get more detailed picture of issues, cases or events (Arora and Stoner 2009). Quantitative research is the process of collecting, analyzing, interpreting, and writing the results of a study. [4]

The data collection technique used in this research is a structured interview technique directly to official staff of PT Angkasa Pura II, namely Halim Perdanakusuma Airport Airside Junior Manager Mr. Bambang Sudarnanto and OIC Manager (Officer In Charge) Mr. Erick Arrahman who handle daily operations of Halim Perdanakusuma Airport as a commercial airport.

The researchers recorded all answers from those official staff. The type of interview used is a structured interview. The written question has been prepare as an instrument. Researchers also conducted library research methods that are carried out by studying, exploring, and quoting theories or concepts from a number of literature, journals, books, and other papers relating to the study of airport capacity, runways, aprons and airport terminal.

3. Discussion

Halim Perdanakusuma Airport is a favourite airport in Jakarta. On January 10, 2014, Halim Perdanakusuma began serving domestic commercial flights scheduled to reduce the excess of Soekarno-Hatta International Airport. Due to the increasing demand for flights at Halim Perdanakusuma airport from year to year, the airport's capacity at Halim Perdanakusuma is already saturated and overcapacity.

Actually, Halim Perdanakusuma airport is an military airport. In 1974, Halim Perdanakusuma airport was transformed into an international airport and in 2014 it was opened to become a commercial airport. Because Halim Perdanakusuma airport was originally used for military activities, this airport is included in the Civil Enclave Airport. Two times a day the Air Force uses the runway for military exercise for 20-30 minutes. Civil Enclave is an airport which is used for both military aviation and civil aviation. They typically contain facilities of both a civil airport and a military base.

1. Runway Capacity

The limited capacity of runway becomes one of the most problematic issues in airline industry. Airlines may have to shorten their flight frequencies and change to larger aircraft sizes with higher operation costs when the capacity of runway can not meet the demand. [5] At an operational level, the difficulty of runway arrangement tries to match definite time for one or multiple runways using relevant cost objectives or realisation criteria. [6]

Runway capacity can be various depending on physical and functional factors such as airport, airspace geometry, air traffic inspection rules, meteorological conditions as well as aircraft. [7] The economic goal of capacity allocation is to encourage flight scheduling by users who provide the highest value to the airport. This determines in one step the number of scheduled flights and capacity allocation for the airline. [8]

The airside capacity of an airport depends instantly on the runway system capacity. This, severally, depends on several factors, but the most important is the Runway Occupancy Time (ROT). This time is the basis for deciding the theoretical maximum runway result. [9]

Because runways represent the main airport infrastructure, therefore the bigger runway capacity is related to airport efficiency. In this research there was only one runway at Halim Perdanakusuma Airport, this could have an adverse effect, especially the problem of flight delays (in minutes) for all arrival and departure flights at Halim Airport. This research table

based on runway capacity utilization. We observed actual data on runway usage per-hour at Halim Perdanakusuma Airport for 7 days.

1.1 Total Runway Capacity Per Hour

Table 1. Total Runway Capacity Per Hour

Total	Runway Capacity Reguler + Irregular
100%	16 Movements

Source: Angkasa Pura II

1.2 Allocation of Hourly Runway Capacity

Table 2. Allocation of Hourly Runway Capacity

UTC	00.00 00.59	01.00 01.59	02.00 02.59	03.00 03.59	04.00 04.59	05.00 05.59	06.00 06.59	07.00 07.59
REG	6	6	6	6	6	12	12	12
IRREG	10	10	10	10	10	4	4	4

UTC	08.00 08.59	09.00 09.59	10.00 10.59	11.00 11.59	12.00 12.59	13.00 13.59	14.00 14.59	15.00 15.59
REG	12	12	12	12	12	12	12	12
IRREG	4	4	4	4	4	4	4	4

UTC	16.00 16.59	17.00 17.59	18.00 18.59	19.00 19.59	20.00 20.59	21.00 21.59	22.00 22.59	23.00 23.59
REG	12	6	6	6	6	6	6	6
IRREG	4	2	2	2	2	2	10	10

Source: Angkasa Pura II

1.3 Actual Data on The Use of Runway at Halim Perdanakusuma Airport Period June 23th – June 30th 2019

Table 3. Actual Data on The Use of Runway

UTC	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	AVERAGE
00.00-00.59	5	4	6	3	6	7	9	6
01.00-01.59	5	7	4	6	6	4	4	6
02.00-02.59	5	6	7	7	7	7	6	7
03.00-03.59	4	3	3	5	2	7	7	5
04.00-04.59	10	3	9	8	5	8	5	7
05.00-05.59	9	14	8	8	9	9	7	10
06.00-06.59	8	9	9	8	9	10	12	10
07.00-07.59	11	12	12	15	12	12	11	13
08.00-08.59	12	10	7	9	9	8	6	9
09.00-09.59	10	13	14	10	11	12	16	13
10.00-10.59	12	8	9	6	11	12	9	10
11.00-11.59	11	9	17	12	9	9	11	12
12.00-12.59	8	8	7	10	9	8	8	9
13.00-13.59	12	10	17	9	4	7	5	10
14.00-14.59	3	3	4	3	7	2	4	4
15.00-15.59	1	1	0	1	4	0	0	2
16.00-16.59	0	0	0	0	0	0	0	0

17.00-17.59	0	0	0	0	0	0	0	0
18.00-18.59	0	0	0	0	0	0	0	0
19.00-19.59	0	0	0	0	0	0	0	0
20.00-20.59	0	0	0	0	0	0	0	0
21.00-21.59	0	0	0	0	0	0	0	0
22.00-22.59	5	4	3	3	4	6	2	4
23.00-23.59	3	6	8	5	5	6	2	5

Source: Data processed by author

Based on actual data, the use of runways has exceeded the runway capacity allocation plan at Halim Perdanakusuma Airport (day 4 and day 7). Runway capacity is closely related to airport performance to serve air travel demand. In this case the exceeding of runway capacity on day 4 and 7 are not significant because it's happened very rarely.

2. Airport Terminal Capacity

Three main factors that influence airport performance are airport capacity, operations management, and flight arrangements that affect airport performance. [1] The airport terminal has many problems that can give an impact on the flow of handling passengers. Another problem facing modern airports is limited infrastructure capacity, including the amount of available resources such as the number of general check-in counters that remain open and the number of available personnel. [10]

Airport expansion is urgently needed when further passenger growth can no longer be served by initial buildings and correlated facilities. [11] However, at airport terminals, high passenger densities pass quickly with relatively constant direction of movement throughout the year. [12] Airport capacity contribution is complicated and need a long planning and construction process. Besides, the investment decision has been made to face a significant demand uncertainty. Therefore, space at many airports sometimes goes under- or over-invested, and if the airport capacity is non-optimal managed, it will lead to welfare loss of a huge number of passengers. [13]

The land side area of an airport implies several type of resources whose operations impact the airport staff and the airline companies performances. Therefore the airport management is curious in wear decision support systems able to maximize customer satisfaction. [14] Terminals become a temporary place to stay and have long operational hours that can reach 24 hours a week throughout the year. [15] The users and functions of the airport terminals can be varied, such as process passenger and baggage check-in, board passengers and baggage to aircraft, transport passengers between flights, accommodate aircraft movements and serve space for commercial areas to promote the airport. [16]

The objective of the research about airport terminal capacity is to reduce overcrowding on passenger delay in the terminals. Due to the problematic nature of demand, such estimations are depended on observation data or simulation models. [17] There were difference between static and dynamic capacity. Static capacity provides information about the state of terminal capacity, as well as the capacity of air space. The other important parameter to be considered is dynamic capacity. Dynamic capacity that pertaining to how many airplane will be arrived at the airport hourly. Dynamic capacity is determined as amount of airplane had been arrived that expressing the occurrence of the monitored phenomenon per time unit. [18]

2.1 Terminal Capacity at Halim Perdanakusuma Airport

Arrival Hall Area	:	3336 m2
Boarding Hall Area Gate 4,5,6,7	:	1406 m2
Boarding Hall Area Gate 8	:	2642 m2
Departure Lobby	:	810,9 m2
Arrival Lobby	:	881,8 m2

Source: PT. Angkasa Pura II

2.2 Data Of Statistic Passenger Movement at Halim Perdanakusuma Airport

Table 4. Passenger Movement at Halim Perdanakusuma Airport

YEAR	PASSENGER MOVEMENT	GROW RATE
2013	86.342.000	
2014	85.131.000	-1,40%
2015	84.292.000	-0,98%
2016	95.175.000	12,91%
2017	105.484.000	10,83%

Source: Data processed by authors

Air transport demand is a necessary parameter for transport planners, airlines, airports, aircraft manufacturers and other related stakeholders. There is a substantial literature on modelling and forecasting demand for passenger air transport. Therefore, demand decreases during the high fares in ticket prices, otherwise demand increases during the low fares in ticket price. [19]

Customers try to get the lowest airline ticket prices while airlines try to keep their overall income as high as possible and maximize their profits.[20] Passengers are more sensitive to prices from time to time; this also need to be recognized in the design of long-term policy equipment. [21] Concentrate on service quality is highly needed if the airlines pursue to improve their market share and further enhance their financial performance in domestic and international markets. [22]

According to the Organization for Economic Cooperation and Development (OECD), airport demand forecasting can be used to provide facts and data that can be useful for developing the routes, planning and investing in infrastructure, competition analysis, risk evaluation, which are used in tactical and strategic decisions. [23] If demand could be completely forecast, an airport could begin the capacity investment and the right amount of capacity would be available at the right time. As capacity mismatch caused by forecast error cannot be fixed in the short term, incomplete planning will guide to either capacity over-supply or airport congestion over an long period. [24]

There are various ways of forecasting demand for air transportation, with basically three categories of techniques: quantitative, qualitative and decision analysis. Quantitative are divided in two kinds, time-series analysis and causal methods. Qualitative methods are usually technological forecasting, decision analysis, etc. [23] The flight system is very complex and difficult. Simulation methods allow analysis of current system conditions and effective forecasting. [18]

2.4 Forecast of Passenger at Halim Perdanakusuma Airport

Table 5. Forecast of Passenger at Halim Perdanakusuma Airport

YEAR	FORECAST	Lower Confidence Bound	Upper Confidence Bound
2018	107.929.144	96.828.263	119.030.025
2019	113.164.423	100.748.292	125.580.554
2020	118.399.702	104.790.344	132.009.061
2021	123.634.182	108.924.685	138.345.279
2022	128.870.261	113.131.928	144.608.594
2023	134.105.540	117.398.603	150.812.477

Source: Processed by authors

From the calculation above passenger growth from 2013 until the estimate to 2023 will increase based on the forecast above by using time series analysis.

4. Conclusio

This paper analysed the determining factor of the possibility of development of Halim Perdanakusuma Airport to respond the growing demand of commercial flight. We would like to give some advices to the management of Halim Perdanakusuma Airports in order to be able to optimize it services especially in the optimality of the passenger terminal. From the forecasting results, it shows that the average grow of the passengers at Halim Perdanakusuma Airport from 2018-2023 is 4,4 percent. The impact of the use of runway by the military and VVIP is the delayed of the civil aviation. Because military flight and VVIP flight has the first priority to be served and it is also impact to the next airport of destination.

For the actual terminal capacity, Halim Perdanakusuma Airports still has enough space to accommodate passengers. There is no need for an expansion of the terminal for Halim Perdanakusuma Airport.

Researchers suggest that close coordination between military and airport operator, airline operator, and the government should be increase and evaluated periodically. Researchers only focuses on the runway allocation, terminal side, and passenger movement. It need to be followed to investigate from the perspective of engineering and commercial aspects.

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