

OPTIMIZING FLIGHT ROUTE AND ACCESSIBILITY IN KERTAJATI INTERNATIONAL AIRPORT TO IMPROVE THE PASSENGERS' SERVICE IN WEST JAVA

Juanita Rahmafatyra^{1*}, Jihan Deski Nurramadhanti², Muhammad Rifni³, Mohamad Zaini⁴

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

*Corresponding author: juanitarahmafatyra@gmail.com

Abstract. Kertajati airport was built and designated by the government as the main airport in West Java province, due to excess capacity of passengers at Husein Sastranegara airport, Bandung. This study discusses the readiness of Majalengka area as an airport area and the steps taken by Kertajati airport to develop the airport, based on a literature study (Meta Analysis) associated with flight management, accessibility, optimization of an airport and related problems. In its development, Kertajati airport is currently still having difficulties in providing optimal airport services in all aspects for passengers due to inadequate accessibility and ecosystems around the airport. These current condition of Kertajati airport has encouraged broad vision to go forward, in which Kertajati airport will need not only build its airport but also to build the area around the airport to support the work of the airport and its ecosystem. In the future, it is expected that Kertajati airport will have superior Aerocity and be equipped with various needs that support flights and cargo movements.

Keywords: Kertajati, Airport Accessibility, Flight Route, West Java, Service Improvement, Air Transport, BJIB, Airport Ecosystem

Introduction

Airport accessibility is an important criterion for airport competition. The airport concept is usually planned separately with the development of the city as a whole in the planning package. The development of the airport and the surrounding area would be an airport development plan for the airport. (Syafarudin and Mulyana 2019). At the beginning of airport development, cash receipts were generally only obtained from flight activities, especially the movement of passengers and goods (Tjahjono and Yuliatwati 2017). Airport accessibility refers to the level of comfort for passengers to arrive at the airport, which can be indicated by the use of various means of transportation. Given that there are differences between airports in technical and operational performance national feature (Bao, Hua, and Gu 2016).

Optimization is achieved by allocating dynamic capacity from time to time between arrivals and departure. In general, the optimal solution provides a time-varying capacity profile that most effectively solves the predicted congestion problem by reflecting the dynamics of traffic demand and operational conditions at the airport (Gilbo 1993).

Husein Sastranegara airport is owned by the West Java's Air Force that built the airfield of the airport conjoined with the Husein Sastranegara air force as the base of the Indonesian Air Force. This airport is used not only for commercial flights but also used as the base of West Java's Air Force, aerospace industry, aviation college, aviation school, aerospace community and the airport itself is developing an aviation museum (Najamuddin 2019). These factors have made Husein Sastranegara airport less effective to be used as an airport that manages all commercial flights in West Java.

West Java, the province with the largest population in Indonesia, has an obstacle to develop in the absence of an international airport infrastructure that capable to accommodate the movement of wide-bodied airplanes for both passengers and goods (Tjahjono and Yuliatwati

2017). At present, the condition of the Husein Sastranegara international airport has been assessed as not capable in serving passengers or cargo, due to its limitations in various fields such as, limited runway length and apron and terminal capacity.

The construction of the Kertajati International Airport located in Majalengka is intended as the replacement airport of Bandung's Husein Sastranegara Airport that has exceeded its capacity. It was recorded that since June 2019, the Indonesian Ministry of Transportation officially had moved all international flights and most domestic flights to Kertajati International Airport (BJIB) which was formerly started at Husein Sastranegara Airport in Bandung.

Method

The methodology applied in this research is meta analysis study, that is conducting library study from various sources such as: journals, reports and text books (Tjahjono and Yuliawati 2017). This study is the most suitable model for interagency competition analysis for airport in context.

The researcher applied both quantitative and qualitative methods to get numeric unchanging and detailed data, as well as description that has deeper meaning in the form of sentences with various things that relevant to this study. The researcher took the samples of asked several people who can be the representative of the population. The researcher applied the non-probability sampling. By quota sampling, it set 35 of passengers in Kertajati International Airport and 35 passengers in Husein Sastranegara Airport.

This research focuses on (1) Obstacles in optimizing the flight route and accessibility in Kertajati Airport, (2) Factors that affecting the improvement of service for the West Java passengers in Kertajati Airport.

Discussion and Result

According to the the survey results given to respondents, it can be seen that Kertajati airport still has very minimum enthusiasm from the passengers since there are only 30% of passengers willing to choose Kertajati airport as their destination or arrival airport. Then, it is found that some passengers still do not know that the current West Java main airport is Kertajati Airport. It happens because this airport still has lack of attention from the public and does not even have publicity to all passengers.

Husein Sastranegara is an airport that is very well known by the public, because it is located only 2.4 km from downtown Bandung which is famous as a holiday destination. This condition is different from Kertajati airport areas, where Majalengka is not a tourist destination. There are still limited public transportation, entertainment facilities, hotels and things that will support the selling point of an airport which make Kertajati airport less desirable for most passengers. These factors make more passengers choose Husein Sastranegara airport as the destination and arrival airport rather than Kertajati Airport which is located approximately 68 km from the city of Bandung.

Route Management

Before the construction of Kertajati airport, all flights to and from West Java were carried out only at Husein Sastranegara airport, Bandung. As the development of the province of West Java increased, the demand for flights to and from West Java was also rising. This condition had made Husein Sastranegara airport reached the point of excess capacity and was unable to accommodate the increasing incoming requests. To maximize the potential of West Java

province, as the province with the largest population, the government decided to build Kertajati airport.

Table 1.

Sector	Year	2017	2018	2019
Aircraft	Total Aircraft	29,361	31,867	24,011
	Increase	3,304	2,506	-7,856
	Growth	12.68%	8.54%	-24.65%
Passenger	Total Pax	3,454,888	3,860,510	2,299,917
	Increase	60,309	405,622	-1,560,593
	Growth	1.78%	11.74%	-40.42%
Cargo	Total Cargo	13,775,366	3,958,347	40.32%
	Increase	19,210,313	5,434,947	39.45%
	Growth	8,976,588	-10,233,725	-53.27%

Annual Airport Transport of Husein Sastranegara Airport
Source: AIRPORT QUALITY & DATA MANAGEMENT
PT Angkasa Pura II (Persero)
KC. Husein Sastranegara International Airport

In accordance with circular letter of the General Director of Civil Aviation No.027 in 2019, domestic flights with jet type carried out in Kertajati. Since 2019, 12 flights have been run at Kertajati Airport. Many factors must be addressed in order to optimize flight routes at the current Kertajati airport. Flight routes will increase with time and increase the number of passengers. Factors that greatly support the increase of passengers are accessibility and the ecosystem around the airport.

Airport Accessibility

Accessibility is still one of the factors that reduces the interest of passengers to use the Kertajati airport. This happens because most passengers come from Bandung city and they feel it is less efficient to travel from Bandung to Kertajati. It is found that 70% of passengers prefer to use Husein Sastranegara airport located in the center of Bandung instead of traveling 62 km in 2.5 hours to reach Kertajati airport (based on survey). Some passengers even choose to use Soekarno-Hatta airport, Tangerang as the destination or arrival airport because the distance between Bandung-Kertajati and Bandung-Jakarta is almost the same.

The efforts to make Kertajati airport easy to access in the future are carried out by Kertajati airport with the authority of the government for public works and public housing (Kemen.PUPR). Cileunyi-Sumedang-Dawuan Toll Road or Cisumdawu Toll Road is under construction and planned to be completed to run this year. This toll road will save time up to 1 hour 50 minutes, then the distance of 62 km of Bandung-Kertajati can be reached in only 40 minutes. Bandung-Kertajati toll road plan is divided into 6 sectors, as follows;

- a) Sectors 1,2,3 : Cileunyi-Kertajati, this toll road construction has been completed and is ready to operate in July 2021.
- b) Sectors 4,5,6 : Cimalaka-Dawuan, this toll road construction will begin in July 2020 and is expected to be completed in the middle of 2022.

Apart from the construction of toll road as a means to facilitate access to the Kertajati airport, the government also provides facilities in the form of Jakarta-Bandung fast train that will be deflected and pass through the Kertajati airport. There will be two types of train stop at Kertajati airport. They are the high speed train and the middle speed train. The high speed train needs only 45 minutes to reach Kertajati from Jakarta

Facility and Infrastructure

Kertajati airport facilities and infrastructure have not been fully built, so far they are still in the process of developed. The facility is still in the 1A development stage, namely Phase 1B, which will be the development of terminal expansion and the creation of a second runway. To overcome overcapacity problem and for the airport's own infrastructure, Kertajati is in the construction phase of supporting facilities such as the ecosystem around the airport in the form of hospitals, hotels, and other facilities. Kertajati airport currently has a very complete and good facilities, and it meets the service, security and safety requirements in operation. Being the second largest airport in Indonesia after Soekarno Hatta Airport, Kertajati airport has a land area of 1,800 ha, which currently only used 1,042 ha of the total land area.

Kertajati airport is very adequate in facilities and infrastructure. As new operating airport, Kertajati airport has a runway length of around 3000x60 m, an instrument landing system (ILS) on runway 14, a weather monitoring equipment or known as AWOS at the end of runways 14 and 32. This airport has complete visual facilities such as the Precision Approach Pathway Indicator (PAPI) and other supporting foundation lights. As an addition it also has a parking stand with 22 parking lots for aircrafts contains of 12 parking spaces facing the terminal, 4 parking spaces for wide bodies aircraft equipped with 4 garbarata, and 10 parking spaces for narrow bodies aircraft.

Kertajati airport terminal covers currently 96,250m² area and can be used to accomodate 5,6-11 million visitors per/year. For kertajati infrastructure with phase 1A, it has used only 1,042 ha so there are still 758 ha available and this is intended to expand the airport. In the future, when Kertajati airport passengers increase, this airport will need expansion to accommodate more passengers. Then, at the time the airport expansion is needed, construction of phase 1B will be carried out, in which the terminal will expand to 200m² and can accommodate 29 million passengers per year. Currently, the developed airport trains are Jakarta-Bandung fast train that is already under construction and the medium speed train from Jakarta to Surabaya which will also be built as soon as possible. Having those trains will help Kertajati airport to attract interest and provide optimal service to passengers from Jakarta and BODETABEK. To improve optimal service for West Java residents, especially Bandung, Kertajati airport also provides solutions such as the Cisumdawu toll road which can shorten the journey from Bandung to Kertajati.

Other facilities and services are also being developed to support Kertajati Airport, such as hotel, hospitals sharing other entertainment that are still in progress. The construction of infrastructure development for the ecosystem in the airport area is followed by airport development. If the construction of the Cisumdawu toll road has been completed, traffic will be launched and investors will start innovating at the airport. Those condition will make kertajati airport improved and more developed.

Airport Optimization

44% of passengers agree and 33% of passengers strongly agreed that they still have not chosen Kertajati airport as an airport for their arrival or departure due to the limited routes and flight schedules. This is also one of the reasons why passengers choose Bandung airport over Kertajati airport too (based on survey). In the opening at 2019, Kertajati airport has only done 12 flight routes, of course this has limited the intended route. similar to cargo flight services that have not

yet paid attention to their needs. Therefore Kertajati airport has already planned to increase traffic and also increase their cargo flight services.

Table 2.

NO.	MONTH	FLIGHT			PASSANGER			CARGO(KG)			LOAD FACTOR	OTP
		ARR	DEP	FLIGHT	ARR	DEP	PASSANGER	INCOMING	OUTGOING	TOTAL		
1	JANUARY	51	51	102	2,326	1,711	4,037	-	-	-	28.71%	93.40%
2	FEBRUARY	32	32	64	1,203	1,253	2,456	-	-	-	21.36%	93.94%
3	MARCH	24	24	48	719	671	1,390	-	-	-	15.38%	100.00%
4	APRIL	5	5	10	117	78	195	-	-	-	10.85%	91.67%
5	MAY	7	7	14	81	51	132	-	-	-	13.00%	100.00%
6	JUNE	4	1	5	383	143	526	-	-	-	65.95%	60.00%
7	JULY	455	456	911	52,144	52,790	104,934	14,593	-	14,593	63.71%	88.65%
8	AUGUST	378	378	756	44,609	42,215	86,824	14,512	-	14,512	58.91%	90.74%
9	SEPTEMBER	328	329	657	36,592	35,826	72,418	13,462	-	13,462	56.44%	77.63%
10	OCTOBER	280	281	561	33,020	30,973	63,993	17,421	-	17,421	58.15%	74.46%
11	NOVEMBER	268	268	536	29,643	27,898	57,541	17,212	-	17,212	54.79%	80.04%
12	DECEMBER	303	303	606	32,364	34,038	66,402	12,693	51,810	64,503	56.12%	76.91%
TOTAL		2135	2135	4270	233,201	227,647	460,848	89,893	51,810	141,703	41.95%	85.62%

Traffic Data 2019 of Kertajati International Airport
Source: BJIB Kertajati Flight Statistics Book 2019

Accessibility also affects airport optimization. When access to Kertajati airport is limited, it will result in the lack of passenger interest. Then it will straightly affect the existence of routes availability at Kertajati airport itself.

To increase the number of available routes at Kertajati airport, the airport must cooperate with the airlines to conduct open ticket trials with the aim of new routes. If during the open ticket period many tickets are sold and the market has been seen, then the airport can patent a new route together with the airlines. Solving the problem of limitation of Kertajati airport routes will automatically improve the accessibility to Kertajati airport.

The way of the Kertajati airport to overcome the problem of cargo flight is by building Cargo Village. A Freight Village or cargo village is an area in which all activities related to transport, logistics, and distribution of goods, both at the domestic and international level, are carried out by various operators (Europlatforms 2004). Cargo village is used as a cargo terminal with one-stop service, where all activities related to cargo will be carried out there so as to make the process more efficient in various aspects.

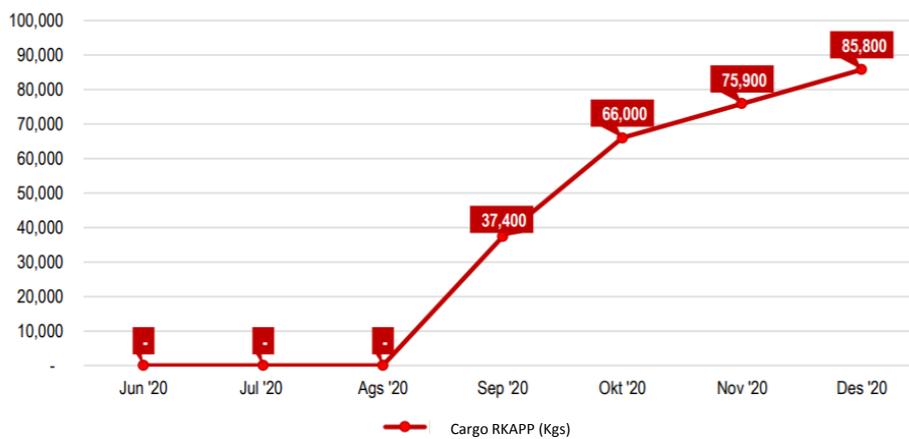
Kertajati Airport Development

As of March 1, 2020 all commercial flights that arrived and departed from Kertajati airport were stopped due to the COVID-19 pandemic. Since then the Kertajati airport has been used as one of the airports to accommodate grounded aircrafts and only serve a few charter flights. The airport is one of the state-owned infrastructures that must not be totally closed, so the Kertajati airport continues to serve charter flights and continues to operate as an alternate aerodrome to anticipate when an aircraft needs emergency landing. All Kertajati Badara personnel are always present with health protocols and they impose cuts in operating hours and human resources. One of Kertajati airport's efforts to keep up with its passengers is through promotion and education through social media.

Kertajati Airport is preparing a business project going forward, currently it is also auctioning the construction of hotels and convention halls around the airport. There has been a tender winner for the maintenance, repair and overhaul business (aircraft repair shop), currently preparing a cargo village (a cargo terminal with one-stop service), as well as conducting Aerocity preparations located on the left side of the airport (3,480 hectares). Inside the Aerocity there will be apartments, cargo hubs, residential areas, and many creative businesses, all with a total of 6 clusters. While the airport still cannot operate, this is an opportunity for Kertajati airport to prepare for business to go forward. With the hope that in the next 2 years all construction can be completed and the flight has returned to normal in coincide with the state of Kertajati airport that will be settle and set up,. Then the Cisumdawu toll road construction has also been completed and the ecosystem around the airport has been resolved.

Conclusion

Figure 2.



Forecasting of Kertajati International Airport Cargo Traffic

Source: Feasibility Study ; Kertajati International Airport Cargo Village

The three pillars of airport management are passenger, cargo and aircraft. Since Kertajati Airport was officially inaugurated until now, it is still far from being said to be a busy airport compared to the international airport of Soekarno hatta, which is almost equal in size. With an airport area of 1800 hectares, Kertajati Airport decided to make a cargo village inside the area of the airport. Cargo Village was created to develop Indonesia's small cargo terminal and increase airport revenues. The cargo village logging is divided into 2 stages of development.

Table 3.

Stage	Area (in hectares)	Capacity (tons/year)
1	18	300.000
2	12	500.000

Kertajati International Airport Development Stages

Source: AIRPORT QUALITY & DATA MANAGEMENT

PT Angkasa Pura II (Persero)

KC. Bandara Internasional Kertajati

Kertajati Airport began operating cargoes in December 2019 at 1.7%. This is better than to the previous months which never reached 1%. According to Salahudin Rafi the President Director of PT.BJIB, the construction of a cargo village at the Kertajati airport is very appropriate. Because it is suitable with the location of Kertajati Airport that is located in a strategic place which covers 70% of regencies / cities in the province in West Java, with Kab. Karawang is the

limit to cover some parts of the western part of Central Java. If later the cargo village has officially operated according to the Kertajati airport, the movement of cargo in Kertajati until 2050 will continue to increase. With the creation of a cargo village, airports around Kertajati such as CGK-HLP-BDO will be interconnected and called as traffic distribution.

Figure 2.



Kertajati International Airport Traffic Optimization

Source: West Java Bappeda

To optimize the cargo village, the West Java governor has confirmed that a golden triangle will be created, where Patimban port, Cirebon port and Kertajati airport can interact with each other via train to increase cargo users at Kertajati airport. It is estimated that Kertajati Airport can operate 500,000 tons of projections per year later.

The application of the Multi-Airport System concept will also be realized, which will later be carried out the Traffic Sharing activity between CGK-HLP-BDO-KJT. Traffic Sharing is done so that the four airports do not have to compete, but instead cooperate with each other. Later Husein Sastranegara Airport in Bandung will become a turboprop / propeller airport for the Multi Airport System and this system will greatly influence the addition of traffic at Kertajati Airport as the youngest airport among others.

References

References list:

- Bao, Danwen, Songyi Hua, and Jiayu Gu. 2016. "Relevance of Airport Accessibility and Airport Competition." *Journal of Air Transport Management* 55:52–60.
- Europlatforms. 2004. "Logistics Centres Directions for Use." *Site: Www. Unece. Org/Trans/Main/Eatl/Docs/EN-REV- ...* 14.
- Gilbo, Eugene P. 1993. "Airport Capacity: Representation, Estimation, Optimization." *IEEE Transactions on Control Systems Technology* 1(3):144–54.
- Najamuddin, Ismail. 2019. "Penelitian Fasilitas Bandar Udara Husein Sastranegara - Bandung." *Warta Penelitian Perhubungan* 26(7):395.
- Syafarudin, Afriapollo, and Bambang Mulyana. 2019. "Formulation Strategy of Pt. Bandara Internasional Jawa Barat Bandung Indonesia, Kertajati in Business Aerocity

(Aerotropolis).” *International Review of Management and Marketing* 9(3):106–11.

Tjahjono, Tri, and Eny Yuliawati. 2017. “Bandar Udara Internasional Jawa Barat (BIJB) Dan Potensi Kertajati Sebagai Aerocity.” *Warta Ardhia* 43(1):43.

Interviewee:

Salahudin Rafi as President Director of Kertajati International Airport

Ibut Astono as Operational Director of Kertajati International Airport