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Airport Selection Analysis for The Implementation of Airport City Concept in East Kalimantan (Case Study: Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan, and Aji Pangeran Tumenggung Pranoto Airport, Samarinda)

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Abstract: The plan to move Indonesia's capital city from Jakarta to North Penajam Paser, East Kalimantan has been officially announced with the issuance of UU No 3 of 2022 concerning the State Capital with the name Ibu Kota Nusantara (IKN). The location of IKN in East Kalimantan province is supported by 2 main airports, namely Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan (BPN) and Aji Pangeran Tumenggung Pranoto Airport, Samarinda (AAP) (PUPR, 2020). The development of the nation's capital city will certainly have an impact on the growth of the two airports as the main supporter of air transportation in East Kalimantan. Airport competitiveness can be measured through the airport competitiveness index (Grancay, 2009). The concept that has been developed in various countries to increase the airport competition index (ACI) is airport city concept. This study describes the analysis of appropriate airports to implement the airport city concept in East Kalimantan using the analytic hierarchy process (AHP) and air traffic forecasting. Based on the results of the AHP, it was found that the ACI value at BPN was 0.705 and AAP 0.295. The most influential criteria to implement airport city concept were market potential (0.410), infrastructure (0.260), traffic (0.259), and charges (0.071), as well as the results of air traffic forecasting analysis in 2040, show the number of passengers at BPN is 17 million passengers and AAP is 4.9 million passengers with traffic distribution of 77.55% at BPN and 22.47% at AAP while the total cargo at BPN is 183 thousand tons and AAP is 9.4 thousand tons with a market share of 95.09% in BPN and 4.91% in AAP. Based on the results of the analysis, it can be said that the airport concept that is feasible to implement airport city is Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan.

Keywords: *Airport City, Airport Competitiveness Index, Air Traffic Forecasting, Indonesia New Capital City*

Introduction

The national capital, which serves as the epicenter and emblem of a nation and state, is a region that is vital to a nation's ability to manage its government (PUPR, 2020) .With the publication of UU No. 3 of 2022 concerning the New National Capital City with the name of Ibu Kota Nusantara, the plan to relocate Indonesia's capital from Jakarta to Penajam

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Paser Utara, East Kalimantan, has been formally declared. The relocation of the nation's capital will have an impact on the surrounding area.

Two major airports, Sultan Aji Muhammad Sulaiman Sepinggan International Airport (BPN) in Balikpapan and Aji Pangeran Tumenggung Pranoto Airport (AAP) in Samarinda, support the site of IKN in East Kalimantan province. As a principal collector, Sultan Aji Muhammad Sulaiman Sepinggan International Airport holds the top airport hierarchy in East Kalimantan. The primary gateway to and from Kalimantan as well as other international/domestic routes meanwhile Aji Pangeran Tumenggung Pranoto Airport serves as the primary supporter for other domestic routes in East Kalimantan's capital region while also serving as a secondary collector.

The rise of the two airports, which serve as East Kalimantan's primary air transportation hub, would undoubtedly be impacted by the development of the nation's capital. To support the prospective increase in passengers in East Kalimantan, particularly in IKN, it is necessary to thoroughly study and analyze the competitiveness of these two airports (PUPR, 2020). The airport competitiveness index can be used to measure the factors that affect an airport's ability to compete (Grancay, 2009). Airport management can determine the airport's competitiveness using the airport competitiveness index's known value, avoiding the risk that airports in the nation's capital won't be able to compete with other airports (Bednarczyk & Grabińska, 2015).

Literature Review

Airport Competitiveness Index

According to Grancay (2009), airport competitiveness index level assessment methodology (ACI) is being used by analyzing 29 busiest airports in the world resulting in the competitiveness value of each airport and whether the airport can compete with others or not. The variable consist of market potential (population, GDP, destination popularity, airport hub, air transport liberalization, air traffic demand), infrastructure (road infrastructure, public transport system, departure delays), charges (airport charges, curfews), traffic

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(pax growth in last 5 years, number of airline serving, number of destination served) and safety. Another model of ACI issued by Bednarczyk & Grabińska (2015) that uses the variable macro, meso and micro environment to gain competitiveness advantages and know the position of regional airports in Poland. Multi-decision criteria model being used to know ACI value in Zurich International Airport with its catchment area by Linden & Wittmer (2017) using managerial factors, environmental factors, demand factors, service factors and facilities factors as the variables.

Airport City

Airport city is basically a concept where the airport be the main magnet on its surroundings by linking with one another and growing in terms of their commerciality, airports should be able to assist the nearby urban area and generate income from sources other than non-aeronautical (Kasarda, 2006). Key components of the airport city concept are broken down into four categories by Kasarda (2008): new non-aeronautic sources of income, land for commercial use that is accessible and inexpensive, a rise in passengers and cargo, and making the airport a catalyst and magnet for corporate growth. The principles of connectivity, space, functionality, and planning must be taken into consideration during the airport development consensus process. Guller (2001) classified facilities related to airport city concept into people oriented facilities and goods oriented facilities. This concept is already implemented in some airports.

Hong Kong International Airport has their ambition to become an airport city by concentrating on airport land development, transforming from a transportation hub to a spectrum-centric economy that includes the development of hotels, entertainment venues and retail (HKIA, 2018) Incheon International Airport has the same mission to build an airport city by dividing the location into 3 supporting cities (Yeongdong, Cheongna, Songdo). The integration between the cities to Incheon International Airport will have a positive impact on the economic growth in South Korea (Kasarda & Chen, 2021).

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Analytical Hierarchy Process

In 1980, Thomas Saaty proposed the analytical hierarchy process (AHP) as a method for making decisions by organizing a hierarchy of criteria, interested parties, results, and enticing numerous considerations in order to generate weights or priority, this approach can solve difficult problems (Saaty, 2008). This approach was used by Munthafa et al (2017) to measure students performance using priority level and percentage level criteria. Utilizing the AHP approach in 2019 to identify vendors for the purchase of spare components (Nugroho, 2019). Adrian & Pradoto (2017) used AHP analysis to identify Tangerang City Government's top development priorities and the potential for creation of an aerotropolis at Soekarno-Hatta Airport. Based on that, AHP approach will be used for making the decision in this research to find a feasible airport to implement airport city in IKN.

Air Traffic Forecasting

In the aviation industry, there are numerous approaches to forecast passenger and cargo demand. Trend projection, econometric analysis, market research, and industry studies are the typical methods to use according to Profillidis (2000). In the aviation industry, there are two organizations mentioned: International Civil Aviation Aviation Organization (ICAO) and International Air Transportation Association (IATA). ICAO has the Doc 8891 AT/22/3 Manual on Air Traffic Forecasting (ICAO, 2006) where it divides forecasts into 3 methods, qualitative, quantitative and decision analysis. IATA argues that using econometric models to make decisions is thought to be the most effective method when airline strategies are adjusted, assumptions are made in a transparent manner, and a thorough analysis of factors that can have long-term effects is conducted (IATA, 2019). Another viewpoint is offered by Airport Council International, which believes that forecasts are best suited for use in airport planning such that short-term forecasts can be used to predict long-term airside and landside planning for 24 developing strategy scenarios (ACI, 2016).

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Advances in Transportation and Logistics Research
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In the econometric models method, regression analysis is carried out as a statistical tool for testing. Regression analysis is used to determine the correlation between two or more variables and make predictions from the analyzed variables (Uyanık & Güler, 2013). There are 2 main variables in regression analysis, namely independent variables (variables that affect) and dependent variables (affected variable).

In airport planning, any forecasting method demand has an element of uncertainty so it needs to use the assumption of alternative or scenario forecasting (FAA, 2001). The use of scenarios in his usual forecasts is assumed by low scenario, medium scenario and high scenario with the level of entering the value of the probability level in each scenario.

Method

This research uses an analytical hierarchy process approach to get the airport city model based on their airport competitiveness index and predict their future demand on air traffic (passengers and cargo) using econometric forecast modeling resulting in the selection of which airport in East Kalimantan for airport city concept implementation.

Discussion and Result

The analysis of this research on airport city concept using airport competitiveness index variable as a competitiveness parameter. The higher the quality of an airport, the higher the competitiveness value it has. Rahayu et al. (2018) research shows that the number of population directly has a significant effect on East Kalimantan's economic growth and the number of travelers using airports increases with population density. The prospective number of passengers who will utilize the airport can rise with an increase in the population (Hafizah, 2018). In 2016, the aviation sector generated 65.5 million jobs globally and contributed at least 2.7 trillion USD, or 3.6% of the global GDP (Group, 2019). Indonesian government air travel liberalization legacy in 2004 (World Bank, 2012) and the recession that occurred in 2008 helps put things into perspective and shows that there is a connection between GDP and global flight (Darmawan, 2012).

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Destination popularity also needs to be considered. Mukkala & Tervo (2013) mention that tourism spurs economic growth (Halpern & Bråthen, 2011). According to the World Travel and Tourism Council, airlines with reasonable ticket costs can increase destination visits in Thailand, contributing 10.6% of the country's GDP, creating 6.6% of jobs, and 90% of visitors coming through air (Law, 2021). This demonstrates why the popularity of tourist attractions has proven to be important in assessing the competitiveness of airports. Hierarchical factors of an airport can be profitable due to the distribution of passengers on a regular basis overall an increase of 19.95%, from the total passenger predictions (Syarif, 2015). It shows that changes in the hierarchy of airports will have an impact on reducing passenger fares, so passenger movements become increasing.

Infrastructure also shows significant effect on airport competitiveness, ranging from airport access (Thanh Truong & Ngoc, 2020), public transport system (Coogan, 2008) and the level of passenger saturation at airports most often occurs due to delays (Cook, 2015)(Rodríguez-Sanz et al., 2018). Airport charges can be another factor to discuss with a 10% increase in ticket prices will reduce passenger demand by 9-11% (Delft, 2018). Existence of airport curfew somehow shows an increase in air traffic and low cost airlines(Sun, 2020) but other issues that will be incurred if the airport does not implement a curfew is the noise problem (FAA, 2009). Airports served by a single airline are less strong than airports served by a number of carriers. With so many airlines serving an airport, they will compete to prevent any one airline from controlling the airport (Starkie, 2012).

Related to air traffic forecasting, this research use GRDP, GRDP per capita, population, exchange rate and dummy variable (airlines capacity rationalization & covid-19 pandemic) as variable on air passenger forecasting (ACI, 2016; IATA, 2019; ICAO, 2006) meanwhile GRDP, foreign domestic investment, domestic direct investment and dummy variable (airlines capacity rationalization & covid-19 pandemic) as variable on air cargo

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forecasting (Baier et al., 2022; Boeing, 2020; IATA, 2019; Suryani et al., 2012).

This research AHP analysis uses purposive sampling in which determination of the sample with certain considerations. The population consists of 4 experts from both regulators and operators in the field of airports and related agencies in East Kalimantan as shown on table 1.

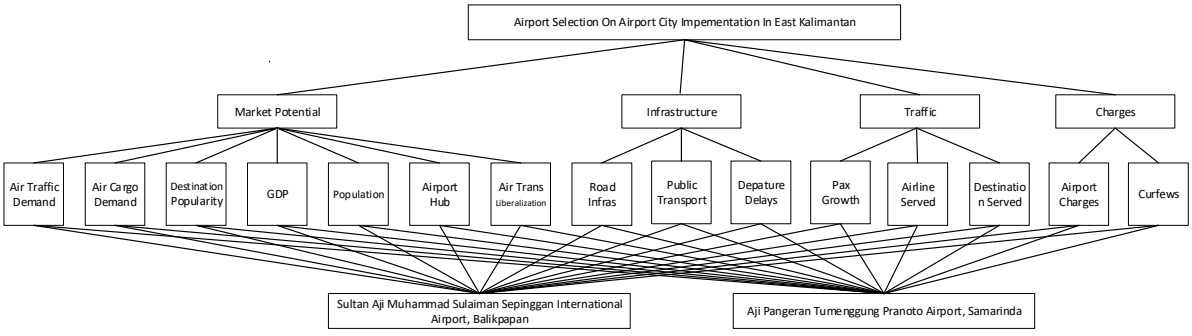
Table 1 Research Respondent Profile

No	Name	Institution	Position
1	Febi Oki Wahyudi, ST, MM	Directorate of Airport, Indonesia Ministry of Transportation	Head of Airport System and Environment
2	Prinali Eka Putra, M.Sc	UPBU Class 1 APT Pranoto Airport	Head of Business Department and Airport Services
3	Muhammad Thamrin	PT. Angkasa Pura I	*Vice President Aeronautical Business & Airline Development*
4	Ir. Iqro Firmani, ST	Ministry of Public Works and Public Housing, East Kalimantan Provincial Office	Head of Spatial Planning

Source : Result of Researcher Data Analysis

The first stage is to break the goal down into a number of components, ranging from the broad to the somewhat more precise. The hierarchy may be whole or partial. Typically, a hierarchy has three levels, such as criterion, sub-criteria, and alternatives. The hierarchy that will be used in the AHP analysis is shown here on figure 1.

Figure 1 Research AHP Hierarchy



Source : Result of Researcher Data Analysis

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Table 2 Research AHP Variable

Criteria	Sub-criteria		Alternative
Market Potential	Im 1	Population	Sultan Aji Muhammad Sulaiman Sepinggan International Airport, Balikpapan
	Im 2	GDP	
	Im 3	Destination Popularity	
	Im 4	Airport Hub	
	Im 5	Air Transport Liberalization	
	Im 6	Air Traffic Demand	
	Im 7	Air Cargo Demand	
Infrastucture	Ii 1	Road Infrastructure	
	Ii 2	Public Transportation System	
	Ii 3	Departure Delays	Aji Pangeran Tumenggung Pranoto Airport, Samarinda,
Charges	Ich 1	Airport Charges	
	Ich 2	Existence of curfews	
Traffic	It 1	Pax growth in the last 5 years	
	It 2	Number of airlines served	
	It 3	Number of destinations served	

Source : Result of Researcher Data Analysis

Based on the results of the questionnaire that has been distributed to purposive samples and has been analyzed using an expert choice application, a weighting of the criteria that have been determined is obtained. Global priority interests criteria in the selection of airports for the implementation of the airport city concept are as follows.

Table 3 Global Priority Results

Goals	Criteria	Sub-criteria	Weight	Alternative	Weight
Airport Selection on Airport City Impementation in East Kalimantan	*Market Potential (0,410)*	*Population*	0,129	BPN	0,746
				AAP	0,254
		GDP	0,139	BPN	0,799
				AAP	0,201
		Destination Popularity	0,146	BPN	0,738
				AAP	0,262
		Aiport Hub	0,088	BPN	0,827
				AAP	0,173
		Air Transport Liberalization	0,043	BPN	0,721
				AAP	0,279
			0,265	BPN	0,629

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
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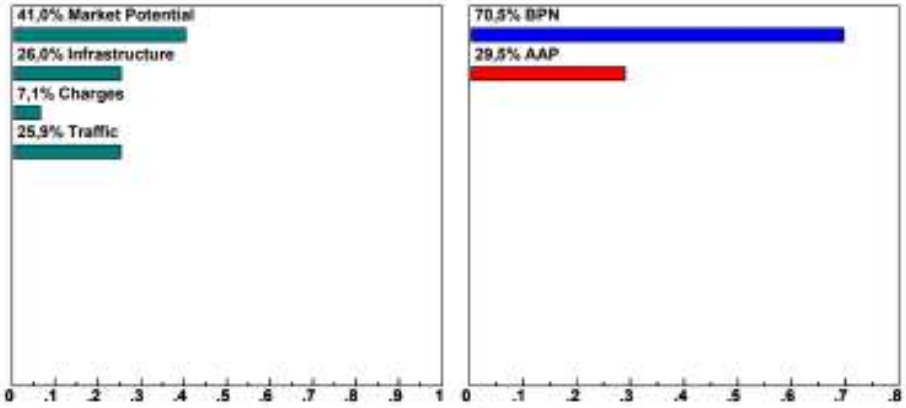
		Air Traffic Demand		AAP	0,371
		Air Cargo Demand	0,189	BPN	0,631
				AAP	0,369
	Infrastructure (0,260)	*Road infrastructure*	0,54	BPN	0,813
				AAP	0,187
		Public transportation system	0,316	BPN	0,781
				AAP	0,219
		Departure delays	0,144	BPN	0,61
				AAP	0,39
	Charges (0,071)	*Airport Charges*	0,76	BPN	0,554
				AAP	0,446
		Curfews	0,24	BPN	0,673
				AAP	0,327
	Traffic (0,259)	*Pax Growth*	0,628	BPN	0,633
				AAP	0,337
		Number of Airlines Served	0,206	BPN	0,75
				AAP	0,25
		Number of Destination Served	0,165	BPN	0,808
				AAP	0,192

Source : Result of Researcher Data Analysis

Figure 2 Airport Selection Analysis Results



Source : Result of Researcher Data Analysis

The analysis showed that BPN was more preferable with a score of 70.5% than AAP that scored 29.5% as the airport that is deserving of implementing the airport city concept in East Kalimantan. The market potential is the most crucial factor followed by infrastructure, traffic and

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charges. This might be taken to suggest that the market potential factor is crucial if a region wants to execute the idea of an airport city.

Forecasting the demand for air traffic at particular airports is another analysis that is used. The number of passengers and historical cargo at the two airports were analyzed together in this study because, according to forecast theory, at least 10 years' worth of historical data should be used, but AAP only became operational in 2018, airline capacity reductions started happening in 2019, and the Covid-19 pandemic hit in 2020, making it impossible for the forecast analysis to fully capture the future conditions. However, by taking into account the traffic distribution (for passengers) and market distribution (for cargo) acquired from the calculation of the compound annual growth rate, the forecast results in this study will highlight the potential of passengers and cargo at both airports. (Hanif et al., 2020)

To find the best model in practicing passangers and cargo forecast, there are several models in trials which find of using the SPSS application to handle statistical data reveal why this model selected. As a result, the following is how this passenger forecast model and cargo model can be applied to the economic regression equation.

Equation 1 Passanger Forecast Model

$$Y = -9733398.741 + 0.127 X1 - 1443449.188 X2 - 3578901.058 X3$$

Y = Number of Passangers
X1 = GRDP Per Capita
X2 = Dummy Variable 1 (airlines capacity rationalization)
X3 = Dummy Variable 2 (Covid-19 Pandemic)

Equation 2 Air Cargo Forecast Model

$$Y = -67898558.825 + 0{,}00000027773 X1 - 22501036.228 X2 - 16873991.041 X3$$

Y = Number of air cargo
X1 = GRDP
X2 = Dummy Variable 1 (airlines capacity rationalization)
X3 = Dummy Variable 2 (Covid-19 Pandemic)

The variable historical data that will be use for forecasting shown on below.

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Table 4 Variable Historical Data

Year	Passanger	Cargo	GRDP Per Capita	GRDP	Dummy 1	Dummy 2
2010	4.911.457	38.185.901	Rp 116.946.310	Rp 383.293.002.210.000	0	0
2011	5.309.065	45.383.971	Rp 121.196.230	Rp 407.436.383.390.000	0	0
2012	6.170.469	51.909.021	Rp 124.501.880	Rp 428.877.710.640.000	0	0
2013	6.789.735	54.043.476	Rp 133.868.680	Rp 438.532.906.740.000	0	0
2014	7.146.598	57.836.396	Rp 133.086.110	Rp 446.029.048.840.000	0	0
2015	6.713.229	54.617.298	Rp 128.603.130	Rp 440.676.356.220.000	0	0
2016	6.683.246	53.805.426	Rp 125.385.500	Rp 439.003.832.390.000	0	0
2017	6.523.872	54.685.436	Rp 126.625.190	Rp 452.741.908.180.000	0	0
2018	6.820.237	61.963.501	Rp 127.354.190	Rp 464.694.426.870.000	0	0
2019	5.916.623	44.724.161	Rp 134.410.550	Rp 486.523.182.210.000	1	0
2020	2.687.093	46.471.724	Rp 125.807.520	Rp 472.554.816.660.000	0	1

Source : Result of Researcher Data Analysis

The increase in provincial GDRP per capita and GRDP is assumed in accordance with East Kalimantan Regional Regulation No. 2 of 2019 concerning the medium-term development plan, GRDP is predicted to be worth ± 1% from 3.5% per year (East Kalimantan Provincial Government, 2019). Thus, the GRDP per capita in the predicted year is assumed to be 2.5% for low scenario, 3.5% for medium scenario and 4.5% for high scenario can be seen below.

The assumption of market and cargo distribution can be calculated using the compounded annual growth rate (CAGR). It can be seen that the CAGR value ± 0.188% per year for the traffic distribution of in term of passanger and the CAGR value ± 0.18% per year for market distribution in term of air cargo for the two airports in the plan year is as follows.

Based on the equation model that has been selected to calculate passenger and cargo forecasts, here are the forecast results in the plan year.

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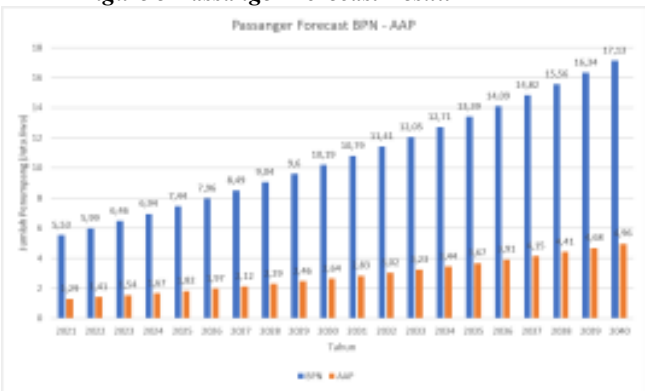
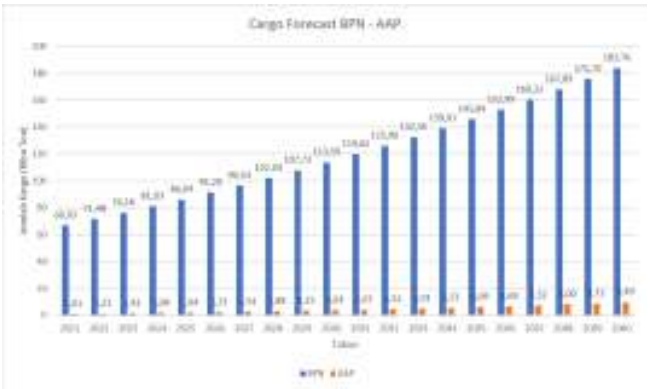
Figure 3 Passanger Forecast Result



Source : Result of Researcher Data Analysis

Data shows an increase in the number of passengers at both airports but there will be a change in traffic distribution from 81.10% in BPN and 18.90% in AAP in 2021 to 77.55% in BPN and 22.47% in AAP in 2040. Therefore, when viewed from the estimated number of passengers, BPN will be superior to AAP. BPN will still be the main airport for passengers in East Kalimantan but AAP has the potential to develop along with the growth in BPN.

Figure 4 Cargo Forecast Result



Source : Result of Researcher Data Analysis

Cargo forecast data shows that cargo at both airports will continue to increase but there will be a change in market distribution from 98.51% in BPN and 1.13% in AAP in 2021 to 95.09% in BPN and 4.91% in AAP in 2040. Therefore, when viewed from the estimated cargo amount, BPN will be superior to AAP. BPN will still be the main airport for cargo in East

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Advances in Transportation and Logistics Research
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Kalimantan but AAP has the potential to develop along with the growth in BPN.

Conclusion

According to the analysis findings utilizing AHP, the airport competitiveness index has a value of 0.705 at BPN and 0.295 at AAP. Market potential (0.410), infrastructure (0.260), traffic (0.259), and charges (0.410) are the most significant priority criteria for determining whether airports in East Kalimantan are deserving of implementation of the airport city idea (0.071). The forecast in 2040 show passangers in both airport will be estimated 17 million passengers at BPN and 4.9 million passengers at AAP also the number of cargo at BPN estimated 183 thousand tons of cargo compared to 9.4 thousand tons of cargo in AAP. In light of the volume of passengers and cargo, BPN has greater development potential. Therefore, It can be concluded that Sultan Aji Muhammad Sulaiman Sepinggan International Airport in Balikpapan is the airport that is feasible of the implementation of the airport city idea in East Kalimantan.

Airport city implementation in others area should pay attention to the weight value of each criteria refer to this reseach. If in the future there are new criteria or sub-criteria that are relevant for airport development, the management has the right to use these criteria and subcriteria into the analysis for more accurate decision making. The prospective demand for passengers and cargo at both airports is growing, so researchers can also examine the multi-airport system at both airports. Further examination of the multi-airport system is anticipated to enhance the quality of air transportation services in East Kalimantan.

References

ACI. (2016). *ACI Guide to World Airport : Traffic Forecast*. *59*.

Adrian, F., & Pradoto, W. (2017). Potential Development of Soekarno Hatta International Airport Area and Tangerang City into Aerotropolis. *Jurnal Pengembangan Kota*, *5*(2), 121–130.

Baier, F., Berster, P., & Gelhausen, M. (2022). Global cargo gravitation model: airports matter for forecasts. *International Economics and Economic Policy*, *19*(1), 219–238. https://doi.org/10.1007/s10368-021-00525-2

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Bednarczyk, M., & Grabińska, E. (2015). *Airport Competitiveness Index : Model and Assessment Methods* (Issue 16488). Jagiellonian University Press.

Boeing. (2020). *World Air Cargo Forecast*. 100.

Coogan, M. A. (2008). Ground Access to Major Airports by Public Transportation. In *Ground Access to Major Airports by Public Transportation*. THE NATIONAL ACADEMIES PRESS. https://doi.org/10.17226/13918

Cook, A. (2015). *European airline delay cost reference values - updated and extended values (Version 4.1)*. *December*.

Darmawan. (2012). The Effect of Air Transport to Economic Development in Indonesia. *Erasmus University of Rotterdam Erasmus School of Economics Department of Applied Economics Master Specialization Urban, Port, and Transport Economics*, *August*.

Delft. (2018). *Taxes in the Field of Aviation and Their Impact*. *10*(6).

FAA. (2001). *Forecasting Aviation Activity by Airport*. *April*, 11.

FAA. (2009). *Final Part 161 Decision on Application for Full Nighttime Curfew*.

Grancay, M. (2009). *Evaluating Competitiveness of Airports - Airport competitiveness index*. *16488*.

Group, I. H. L. (2019). Aviation Benefits Report 2019. *Convention on International Civil Aviation*, 76.

Guller, G. &. (2001). *From airport to airport city* (p. 110).

Hafizah, N. E. L. (2018). *Analysis of Airport Passenger Trip Origin for Access To the Airport (Case Study : Juanda Interanational Airport, Ahmad Yani International Airport and Adisucipto International Airport)*.

Halpern, N., & Bråthen, S. (2011). Impact of airports on regional accessibility and social development. *Journal of Transport Geography*, *19*(6), 1145–1154. https://doi.org/10.1016/j.jtrangeo.2010.11.006

Hanif, M. R., Chrizara, R., Saribanon, E., & Ozali, I. (2020). the Effect of Service Quality and Passenger Satisfaction on Passenger Behavioral Intentions on Lion Air. *Advances in Transportation and Logistics Research*, *3*(0), 481–489. https://proceedings.itltrisakti.ac.id/index.php/ATLR/article/view/301

HKIA. (2018). *Building an Airport City*.

IATA. (2019). *Airport development reference manual 9th Edition* (Issue January).

ICAO. (2006). Manual on Air Traffic Forecasting. *International Organization*, *14*(3), I-1-III–30.

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Kasarda, J. D. (2006). *Airport City and Aerotropolis*.

Kasarda, J. D. (2008). The Evolution of Airport Cities and the Aerotropolis. *Airport Cities: The Evolution*, 1–39.

Kasarda, J. D., & Chen, M. (2021). *Incheon Aerotropolis*.

Law, C. C. H. (2021). The relationship between air transport and rural tourism in Thailand. *Tourism*, *69*(3), 395–405. https://doi.org/10.37741/T.69.3.5

Linden, E., & Wittmer, A. (2017). *A Model for Measuring Airport Competitiveness The Case of Zurich Airport*. *December*.

Mukkala, K., & Tervo, H. (2013). Air transportation and regional growth: Which way does the causality run? *Environment and Planning A*, *45*(6), 1508–1520. https://doi.org/10.1068/a45298

Munthafa, A. E., Mubarok, H., Teknik, J., & Universitas, I. (2017). APPLICATION OF THE ANALYTICAL HIERARCHY PROCESS METHOD IN THE DECISION SUPPORT SYSTEM FOR DETERMINING OUTSTANDING STUDENTS. *Jurnal Siliwangi*, *3*(2), 192–201.

Nugroho, E. A. (2019). Application of Analytical Hierachy Process Method in Selecting Suppliers for Spare Parts Procurement at PT. Jakarta International Container Terminal in 2018. *Skripsi Fakultas Manajemen Bisnis*, 125.

Profillidis, V. A. (2000). Econometric and fuzzy models for the forecast of demand in the airport of Rhodes. *Journal of Air Transport Management*, *6*(2), 95–100. https://doi.org/10.1016/S0969-6997(99)00026-5

PUPR. (2020). *Academic Text of the Draft Law on the National Capital*.

Rahayu, K. I., Michael, M., & Amalia, S. (2018). The effect of population and inflation and private investment on economic growth and unemployment. *Inovasi*, *13*(1), 39. https://doi.org/10.29264/jinv.v13i1.2436

Rodríguez-Sanz, Á., Comendador, F. G., Valdés, R. A., & Pérez-Castán, J. A. (2018). Characterization and prediction of the airport operational saturation. *Journal of Air Transport Management*, *69*(August 2017), 147–172. https://doi.org/10.1016/j.jairtraman.2018.03.002

Saaty, T. L. (2008). Decision Making with Analytic Hierachy Process. *Int. J. Services Sciences, 1*(1), 83–97. https://doi.org/10.1108/JMTM-03-2014-0020

Starkie, D. (2012). The airport industry in a competitive environment: A United Kingdom perspective. *Airport Competition: The European Experience*, *August 2008*, 291–310. https://doi.org/10.1787/9789282102466-3-en

Sun, J. Y. (2020). Airport curfew and scheduling differentiation: Domestic versus international competition. *Journal of Air Transport Management*, *87*, 101839. https://doi.org/10.1016/j.jairtraman.2020.101839

ISSN: 2622-5778 (online)
Advances in Transportation and Logistics Research
http://proceedings.itltrisakti.ac.id/index.php/altr

Suryani, E., Chou, S., & Chen, C. (2012). Simulation Modelling Practice and Theory Dynamic simulation model of air cargo demand forecast and terminal capacity planning. *Simulation Modelling Practice and Theory*, *28*, 27–41. https://doi.org/10.1016/j.simpat.2012.05.012

Syarif, I. I. F. A. (2015). *Analysis of Suitabilty and Effect of Changes in Airport Hierarchy in The Province of North Borneo*.

Thanh Truong, T. M., & Ngoc, A. M. (2020). The city-airport connection, implications for urban transport planning in motorcycle-dominated cities. *Transportation Research Procedia*, *48*(September), 3232–3244. https://doi.org/10.1016/j.trpro.2020.08.155

Uyanık, G. K., & Güler, N. (2013). A Study on Multiple Linear Regression Analysis. *Procedia - Social and Behavioral Sciences*, *106*, 234–240. https://doi.org/10.1016/j.sbspro.2013.12.027