Capacity Analysis of the Number of Check-In Counter Facilities Based on Peak Hour Passenger Density in 2045 at El Tari Airport, Kupang

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ABSTRACT
This study aims to optimize the capacity of check-in counters at El Tari Airport in Kupang to accommodate the projected passenger growth up to 2045. The method used is quantitative forecasting, with linear regression analysis to project passenger growth and check-in counter capacity. Data were analyzed using Microsoft Excel and IBM SPSS Statistics, showing an annual passenger growth rate of 15%. By 2045, the number of passengers is projected to reach 8.945.600, with a peak hour passenger count of 4.473, requiring the addition of 44 check-in counters to meet the standards. These findings have significant implications for airport infrastructure development to ensure smooth operations.
Keywords: *check-in counter capacity, passenger growth, peak-hour service, El Tari Kupang Airport*

1. INTRODUCTION

Airports are integral to the aviation industry, playing a critical role in ensuring the smooth, safe, and efficient operation of air travel. They serve as the infrastructure necessary for the takeoff and landing of aircraft, the boarding and disembarking of passengers, and the handling of cargo. Given the increasing reliance on air travel due to its advantages over other transportation modes—primarily its safety and time efficiency—airports must provide robust support to accommodate the growing demands of the aviation sector. They are essential not only for facilitating the core functions of air travel but also for enhancing the comfort and convenience of users.

According to Regulation No. PM 39 of 2019 on National Airport Systems, an airport is defined as a designated area for aircraft operations, including takeoff and landing, equipped with necessary safety, security, and supporting facilities. This regulatory framework highlights the importance of airports in connecting various regions, particularly remote areas that may have significant tourism potential but are difficult for both domestic and international tourists to access. In this context, airports serve as crucial gateways that bridge distances and facilitate economic and recreational activities.

For instance, El Tari Airport in Kupang, East Nusa Tenggara, exemplifies the vital role airports play in regional connectivity. Kupang is renowned for its tourist attractions, making its airport a key facilitator of tourism and regional development. El Tari Airport, categorized as a Hub Airport, serves as a primary entry point for travelers to East Nusa Tenggara and acts as a consolidation hub for local passengers traveling to other destinations. Situated in Penfui, Maulafa District, Kupang, the airport has a rich history, having been operational since 1928. Originally named Penfui Airfield, it was renamed El Tari Airport in 1988 in honor of General Elias Tari, a prominent figure and former governor of East Nusa Tenggara. The airport is managed by PT Angkasa Pura I, a major player in Indonesian airport management.

The infrastructure of El Tari Airport includes a 2,500-meter runway, which supports its current operations involving approximately 20 domestic flights and one international flight serviced by nine airlines. This operational capacity reflects the airport's significant role in regional air travel. The increasing number of flights and the corresponding rise in passenger volumes underscore the necessity for continuous evaluation and planning of airport facilities. As air traffic grows, so too does the need for an effective capacity management strategy to ensure that the airport can accommodate future demands.

Passenger numbers at El Tari Airport are meticulously recorded, with data collected daily and summarized monthly to provide an annual total. This data

collection process is critical for assessing the airport's capacity and planning for future growth. Particularly during peak hours, when passenger density reaches its maximum, understanding these figures becomes crucial for effective capacity management. The annual passenger data not only helps in evaluating current facility usage but also in forecasting future demands. This forecasting is essential for strategic planning, especially as the year 2045 approaches, which represents a significant milestone in Indonesia's development plans.

The focus of this study is to analyze the capacity of El Tari Airport's check-in facilities in light of increasing passenger numbers and to determine future needs based on projected growth. The research, titled "Analysis of Check-in Counter Capacity Based on Peak Hour Passenger Density for 2045 at El Tari Airport, Kupang," aims to provide a detailed assessment of the current and future requirements for check-in counters. By examining the peak hour passenger density, the study seeks to address the challenges associated with accommodating increasing passenger volumes and to inform the development of strategies to enhance airport capacity and efficiency.

In summary, airports like El Tari in Kupang play a pivotal role in supporting regional connectivity and facilitating economic development. The study of check-in counter capacity at such airports is crucial for ensuring that they remain capable of meeting future demands. By analyzing current usage patterns and forecasting future needs, the research contributes to effective planning and development, helping to ensure that airports can continue to support the growing demands of air travel efficiently and effectively.

2. MATERIALS AND METHODS

This research was conducted at El Tari International Airport, Kupang, is located at Adi Sucipto Street, Penfui Village, Maulafa District, Kupang City, East Nusa Tenggara. The geographic coordinates of El Tari Airport are 10˚10'06"S and 123˚40'04"E.

Figure 1. Location of El Tari Airport, Kupang

This study is a quantitative research project that utilizes forecasting analysis to estimate future conditions based on past and present data. Forecasting is a critical methodological tool used to predict future events or trends by analyzing historical and current data. This process allows researchers and practitioners to anticipate potential outcomes and make informed decisions to address future challenges. By examining patterns and trends from previous data, forecasting provides a framework for planning and decision-making, helping to mitigate risks and optimize outcomes. For instance, if past actions have had negative consequences, forecasting can help in developing strategies to avoid similar issues in the future [1].

Forecasting can be categorized into two main types: quantitative and qualitative forecasts. Quantitative forecasting is grounded in numerical data and statistical methods. This type of forecasting relies on historical data to predict future trends, with the results heavily dependent on the accuracy and relevance of the data used. For quantitative forecasts to be effective, three key conditions must be met: (1) there must be relevant information about other circumstances that could impact the forecast, (2) this information needs to be quantifiable, meaning it can be represented in numerical terms, and (3) it is assumed that the data will follow a consistent pattern into the future. The consistency of data patterns is crucial for making reliable predictions, as it provides a basis for extrapolating future trends from historical observations.

In contrast, qualitative forecasting does not rely on numerical data but instead on non-numerical information such as expert opinions, historical context, and subjective assessments. The results of qualitative forecasts are influenced by the perspectives and judgments of the individuals who compile them. This approach is often used when numerical data is insufficient or unavailable. Qualitative forecasts may involve investigating

relationships between dependent and independent variables based on normative characteristics or expert insights. This method can be particularly useful for understanding complex scenarios where numerical data alone might not capture all relevant factors [2].

Given the focus of this study on analyzing the capacity of check-in counter facilities at El Tari Airport, Kupang, quantitative forecasting methods are employed. These methods are particularly suited for scenarios where there is substantial historical data that can be analyzed to project future conditions. By applying statistical techniques to historical passenger data, the study aims to predict future passenger volumes and assess the corresponding capacity needs for check-in counters. This approach allows for a data-driven analysis of how increasing passenger density during peak hours will impact the requirements for check-in facilities.

A research variable is defined as any factor or element that a researcher chooses to investigate to obtain the necessary information and draw conclusions. Variables are fundamental components in research, as they represent the key elements being studied. Research variables are typically classified into two categories: independent and dependent. An independent variable is one that influences or affects other variables. It is the variable that is manipulated or controlled in an experiment to observe its effects on other variables. In contrast, a dependent variable is one that is not independent; it relies on and is influenced by the independent variable. The relationship between these variables is central to understanding the dynamics of the research subject and drawing valid conclusions.

In this study, the independent variable is the Peak Hour Passenger Density at El Tari Airport, Kupang. This variable represents the volume of passengers during peak hours and is a critical factor in determining the airport's capacity needs. The dependent variable is the Capacity of Check-in Counter Facilities at El Tari Airport. This variable reflects the adequacy of the check-in counter facilities to handle the passenger volume during peak times. By examining the relationship between these variables, the study aims to determine how the increasing passenger density will impact the capacity requirements for check-in counters.

The research object encompasses a comprehensive description of the study area or target, including its characteristics, historical development, organizational structure, main tasks, and other functions relevant to the scope of the research. In this context, the research object is the Peak Hour Passenger Density projected for 2045 at El Tari Airport, Kupang. This focus involves analyzing the anticipated passenger volume during peak hours and determining the necessary capacity for check-in counter facilities to accommodate this volume. Understanding the research object in detail is crucial for assessing the current and future needs of the airport, ensuring that the facilities are appropriately planned and developed to meet future demands.

Overall, this study aims to provide valuable insights into the capacity requirements for check-in counters at El Tari Airport by analyzing forecasted passenger density. Through the application of quantitative forecasting methods, the research seeks to project future conditions based on historical data and offer informed recommendations for facility planning and development. This approach is essential for ensuring that the airport can efficiently handle growing passenger numbers and maintain high standards of service and operational efficiencyThe data collection method is a statement regarding certain characteristics, conditions, or activities. Data collection is conducted to obtain the necessary information to achieve the research objectives (Hartono, 2018). In this context, the data collection method used by the author aims to facilitate the gathering of data for the Analysis of Check-In Counter Facility Capacity Based on Passenger Density During Peak Hours at El Tari Airport, Kupang. Several data collection techniques used by the author include literature review, observation, data collection from relevant parties, calculation of check-in facility needs, and calculation of facility requirements based on regulations.

First, the literature review involves using library sources and other relevant data related to the research problem, including regulations and guidelines from various sources. Second, direct observation is conducted during the author's On-The-Job Training at El Tari Airport, Kupang, to directly observe events, locations, and necessary data, as detailed in Appendix A. Third, data provided by El Tari Airport, Kupang, related to the research problem is collected, including passenger data over five years from 2014 to 2018 during peak hours, which is essential for forecasting the increase in service users and the condition of the existing check-in counter facilities. Furthermore, the need for check-in counter facilities is calculated based on projected future passenger numbers, using guidelines from SKEP/77/VI/2005 issued by the Ministry of Transportation of the Republic of Indonesia, the Indonesian National Standard (SNI), and the latest regulation, PM 41 of 2023.

According to Sugiyono (2013), an instrument is a tool used to measure an object or to collect data from a variable. In this context, an instrument serves as a means to obtain and gather research data, facilitating the process of deriving results and conclusions from the study. Research instruments can include various tools such as tests, interview guides, and observation guidelines used by researchers to collect data. In this final project research, the author employs research instruments such as passenger count calculations using forecasting with linear regression analysis and standards for calculating the required number of check-in counters. This research uses software tools including Microsoft Excel and IBM

SPSS Statistics. These programs are utilized to process passenger data and develop the necessary linear regression model. Through linear regression data, predictions can be made regarding passenger numbers and the required check-in counter capacity for the next 27 years.

In forecasting passenger numbers, a simple linear regression formula was used. In forecasting the number of passengers, the simple linear regression method is used. The Simple Linear Regression Equation model is presented in equation (1).

$$Y_x = a + bX_n \quad (1)$$

Y_x= number of passengers in year-x
X_n= independent variable for year-x
a= intercept (constant)
b= coefficient indicating the influence of variable X_n on Y_x

To determine the values of a and b, they can be determined through calculations using equation (2) and (3).

$$a = \frac{(\sum y)(\sum x^2)(\sum x)(\sum xy)}{(n(\sum x^2)-(\sum x)^2)} \quad (2)$$

$$b = \frac{(n\sum xy)-(\sum x)(\sum y)}{(n(\sum x^2)-(\sum x)^2)} \quad (3)$$

3. RESULTS AND DISCUSSION

3.1 Annual Passenger Forecast

The number of passengers at El Tari Airport is predicted to increase over the next 27 years. This is because the data used as a reference for forecasting calculations shows an average increase of up to 15%. The data in question refers to passenger movement data that has shown an increase over the past five years, specifically from 2014 to 2018. The data on domestic and international departing passengers at El Tari Airport Terminal in Kupang from 2014 to 2018 shows a consecutive increase each year. This data will be used as a reference to forecast passenger projections for the next 27 years and to analyze the need for check-in counter facilities at the airport terminal. The data can be seen in Table 1.

Table 1. Passenger Increase Data for the Years 2014-2018

No	Year	Passenger		Total	Growth (%)
		Departure	Arrival		
1	2014	659.299	651.435	1.310.734	
2	2015	752.487	770.564	1.523.051	16%
3	2016	906.374	1.035.691	1.942.065	28%
4	2017	930.427	1.169.445	2.099.872	8%
5	2018	992.697	1.257.289	2.249.986	7%
		Average increase			15%

The potential increase in passenger numbers each year has drawn particular attention from the Secretary General of the Ministry of Transportation in 2018, Mr. Ir. Sugihardjo, M.Si, who stated, "El Tari Airport was originally designed for 1.3 million passengers per year, but it has now exceeded 1.9 million passengers. As a result, PT Angkasa Pura I plans to expand the passenger terminal from the current one-story building to a two-story facility," as quoted from an interview on the official website of the Ministry of Transportation of the Republic of Indonesia. According to data from the 2020 Christmas and New Year Air Transport Integrated Post (Posko Nataru), El Tari Airport recorded an increase in traffic, particularly in aircraft and cargo movements. During the Christmas and New Year holiday period, from December 19 to 31, 2019, El Tari Airport handled 1,013 flights, a one percent increase compared to the 2018/2019 holiday season. Cargo transportation statistics also showed an increase, with 332,574 kg of cargo transported, up from 289,089 kg in the previous 2018/2019 period, reflecting a 15% increase.

To determine the predicted passenger values, the data obtained from the table are subsequently input into the linear regression equations (2) and (3) to calculate the values of a and b. These values are then inserted into the linear regression model equation (1). From the results, the passenger growth data for the years 2019-2045 is presented in Table 2.

Table 2. Passenger development 2019-2045

Annual Passenger Number Forecast				
Year	A	B	X	$Y_x = a + bX_n$
2019	1.088.544	245.533	6	2.561.742
2020	1.088.544	245.533	7	2.807.275

2021	1.088.544	245.533	8	3.052.808
2022	1.088.544	245.533	9	3.298.341
2023	1.088.544	245.533	10	3.543.874
2024	1.088.544	245.533	11	3.789.407
2025	1.088.544	245.533	12	4.034.940
2026	1.088.544	245.533	13	4.280.473
2027	1.088.544	245.533	14	4.526.006
2028	1.088.544	245.533	15	4.771.539
2029	1.088.544	245.533	16	5.017.072
2030	1.088.544	245.533	17	5.262.605
2031	1.088.544	245.533	18	5.508.138
2032	1.088.544	245.533	19	5.753.671
2033	1.088.544	245.533	20	5.999.204
2034	1.088.544	245.533	21	6.244.737
2035	1.088.544	245.533	22	6.490.270
2036	1.088.544	245.533	23	6.735.803
2037	1.088.544	245.533	24	6.981.336
2038	1.088.544	245.533	25	7.226.869
2039	1.088.544	245.533	26	7.472.402
2040	1.088.544	245.533	27	7.717.935
2041	1.088.544	245.533	28	7.963.468
2042	1.088.544	245.533	29	8.209.001
2043	1.088.544	245.533	30	8.454.534
2044	1.088.544	245.533	31	8.700.067
2045	1.088.544	245.533	32	8.945.600

The predicted number of passengers for the next 27 years, up to 2045, shown in the Table indicates an annual increase. This continuous rise in passenger numbers will inevitably impact peak hour congestion, affecting both departing and arriving passengers, to accommodate a total of 8.945.600 passengers by 2045.

3.2 Annual Peak Hour Passenger Forecast

The Regulation of the Minister of Transportation of the Republic of Indonesia No. 41 of 2023 on Airport Services serves as a reference for forecasting peak hour passengers (PWS) for the years 2019-2045. Based on the Table 2, it can be observed that by 2045, the estimated number of passengers will reach 8 million per year. The determination of the peak hour passenger coefficient is adjusted according to the annual passenger numbers outlined in Regulation No. 41 of 2023, as shown in Table 3 below:

Table 3. Determination of peak hour passenger coefficient

Number of Pax/Year (Million)	Coefisien PWS (%)	PWS
> 30	0,035%	> 10,500
20 – 29,999	0,040%	8000 – 11999
10 – 19,999	0,045%	4500 – 8999
1 – 9,999	0,050%	500 – 4999
0,5 – 0,999	0,080%	400 – 799
0,1 – 0,4999	0,130%	130 – 649
< 0,1	0,2%	< 200

Subsequently, to determine the calculation of peak hour passengers for the years 2019-2045, the process refers to the coefficient obtained from Table 3, which is then accumulated into the following formula.

$$PWS = \frac{number\ of\ passegers\ each\ year\ x\ coef}{100} \quad (4)$$

The results of the peak hour passenger calculations for the years 2019-2045 can be seen in Table 4.

Table 4. Result of peak hour calculating for 2019-2045

Year	Number of pax/year	Coefisien	PWS
2024	3.789.407	0,05%	1.895
2025	4.034.940	0,05%	2.017
2026	4.280.473	0,05%	2.140
2027	4.526.006	0,05%	2.263
2028	4.771.539	0,05%	2.386
2029	5.017.072	0,05%	2.509
2030	5.262.605	0,05%	2.631
2031	5.508.138	0,05%	2.754
2032	5.753.671	0,05%	2.877
2033	5.999.204	0,05%	3.000
2034	6.244.737	0,05%	3.122
2035	6.490.270	0,05%	3.245
2036	6.735.803	0,05%	3.368
2037	6.981.336	0,05%	3.491
2038	7.226.869	0,05%	3.613
2039	7.472.402	0,05%	3.736
2040	7.717.935	0,05%	3.859
2041	7.963.468	0,05%	3.982
2042	8.209.001	0,05%	4.105
2043	8.454.534	0,05%	4.227
2044	8.700.067	0,05%	4.350
2045	8.945.600	0,05%	4.473

Table 4 presents the forecast of peak hour passenger numbers, both for arrivals and departures. The predicted number of passengers in 2045 is 4,473. To determine the required capacity of check-in counters at El Tari Airport in Kupang by 2045, an analysis of the number of departing passengers and peak hour traffic during that year must be conducted.

3.3 Peak Hour Passenggers Forecasting of Departures and Arrivals

To determine the peak hour arrival and departure passengers, the average percentage of each dataset is used, with the average percentage for arriving passengers being 54% and for departing passengers being 46%.

Next, from the results of the average passenger percentages, data on peak hour passengers for both departures and arrivals will be obtained. This is done to forecast peak hour departure passengers, which will be used for analyzing the number of check-in counters needed at the departure terminal of El Tari Kupang Airport. The average passenger percentages are calculated with the total peak hour passenger data, resulting in the data shown in Table 5.

Table 5. Average Percentage Calculation Results of Passengers to Total Passengers Peak Hour

Year	PWS	Departure (46%)	Arrival (54%)	Passengers Transfer (20%)
2024	1.895	697	819	379
2025	2.017	742	871	403
2026	2.140	788	924	428
2027	2.263	833	978	453
2028	2.386	878	1.031	477
2029	2.509	923	1.084	502
2030	2.631	968	1.137	526
2031	2.754	1013	1.190	551
2032	2.877	1059	1.243	575

2033	3.000	1104	1.296	600
2034	3.122	1149	1.349	624
2035	3.245	1194	1.402	649
2036	3.368	1239	1.455	674
2037	3.491	1285	1.508	698
2038	3.613	1330	1.561	723
2039	3.736	1375	1.614	747
2040	3.859	1420	1.667	772
2041	3.982	1465	1.720	796
2042	4.105	1511	1.773	821
2043	4.227	1556	1.826	845
2044	4.350	1601	1.879	870
2045	4.473	1646	1.932	895

From the results of the table, it is predicted that the number of peak hour departing passengers in 2045 will be 2,058. Based on the linear regression analysis of peak hour passengers, it is possible to determine the required capacity for check-in counters at El Tari Kupang Airport in 2045. To assess whether the current capacity of check-in counters at the airport meets the standards set by PM 41 of 2023 and to plan the necessary capacity for check-in counters in 2045, it is essential to compare the number of check-in counters with peak hour passengers for both 2024 and 2045.

3.4 Analysis of Check-In Counter Facility

To meet the current standards for check-in facilities and to plan for the necessary check-in counters in 2045, supporting data is required, including peak hour passenger data for the years 2024 and 2045, as well as departing passenger data for those years. According to the table, in 2024, the annual peak hour passengers are expected to total 1,895, and in 2045, the number will rise to 4,473. The number of peak hour departing passengers in 2024 is projected to be 697, while in 2045, it is expected to be 1,646. This data is then used to calculate the number of transfer passengers. As explained in SKEP 77/VI/2005, the number of transfer passengers is equal to 20% of the peak hour passengers. Based on this formula, the number of transfer passengers in 2024 is estimated to be 379, and in 2045, it is projected to be 895.

According to the Law of the Republic of Indonesia Number 1 of 2009, Article 204 on Aviation, an airport is a facility/place outside the airport work area that functions to complete various security and service procedures similar to those at an airport. To determine the service time during check-in, it is adjusted according to the Regulation of the Director General of Civil Aviation Number: SKEP/77/VI/2005 concerning the Technical Requirements for the Operation of Airport Technical Facilities, which is further reinforced by the Minister of Transportation Regulation Number: KM 20 of 2005 on the Enforcement of the Indonesian National Standard (SNI) 03-7046-2004 regarding Airport Passenger Terminals as Mandatory Standards. The latest regulation, PM 41 of 2023, concerning Airport Services at Airports, states that the normal time required to wait for the Check-in Counter service process is less than 30 minutes, and the check-in process itself takes 2 minutes and 30 seconds.

The allocation of the number of check-in counters and the required check-in area can be calculated using a formula based on the Regulation of the Director General of Civil Aviation Number: SKEP/77/VI/2005 on the Technical Requirements for the Operation of Airport Technical Facilities, using the following formula [6]:

The calculations used to analyze the planning of check-in counter facility requirements are as follows:

$$N = \frac{(a+b)}{60} xt1\ counter + (10\%) \qquad (5)$$

N = number of tables
a = number of peak hour passengers
b = number of transfer passengers
$t1$ = check-in counter processing time (1.5 minutes/passenger)

Based on the calculations using the formula above, the required number of check-in counter facilities in 2024 is 27, and in 2045 it is 64.

3.5 Current Conditions and Planning Solutions

Currently, El Tari Kupang Airport's terminal has 20 available check-in counter facilities. When we compare this existing number of check-in counters to the capacity requirements based on the guidelines outlined in SKEP 77/2005, it becomes evident that there is a discrepancy with the standards set by the more recent PM 41 of 2023. According to these updated regulations, the airport should have at least 27 check-in counters to meet current standards. The shortfall of seven counters highlights a

significant gap between the existing infrastructure and what is required to provide efficient service. This deficiency not only underscores a lack of compliance with the updated regulations but also suggests that the airport might face challenges in maintaining high passenger service standards. As defined by PM 41 of 2023, having adequate check-in counter facilities is critical for ensuring that passengers receive prompt and satisfactory service. The current shortfall in terminal space and check-in counter capacity at El Tari Kupang Airport is therefore likely to have a negative impact on the overall assessment of passenger service standards.

The findings of this research indicate that, with the current number of check-in counters, El Tari Kupang Airport's alignment with airport service standards, as stipulated by PM 41 of 2023, is only rated 4 out of 5. While this rating reflects a relatively high level of service, it still falls short of the ideal standard set by the latest regulations. This rating not only highlights the immediate need for increased check-in counter capacity but also serves as an indicator of potential future issues as passenger traffic continues to grow. The fact that the airport is already struggling to meet current standards suggests that, without proactive measures, the situation could worsen over time, particularly as passenger numbers increase.

Based on an in-depth analysis of check-in counter capacity at El Tari Kupang Airport, it is clear that enhancements are necessary to accommodate future growth in passenger numbers and to improve overall service functionality. The analysis reveals that, by 2045, the airport will require approximately 44 check-in counters to handle passenger volumes efficiently, especially during peak hours. This projection is derived from a linear regression analysis that takes into account current trends and future growth expectations. The need to increase the number of check-in counters is primarily driven by the anticipated rise in passenger traffic, which is expected to lead to congestion if adequate measures are not taken. Without sufficient check-in counters, passengers may face long wait times and overcrowded terminals, which would negatively impact their overall travel experience and satisfaction.

To effectively address peak passenger congestion and maintain high service standards, several solutions can be considered. One of the most straightforward solutions is to add more check-in counters to prevent queue buildup and enhance service standards in alignment with PM 41 of 2024. This addition of check-in counters should go hand-in-hand with the expansion of the departure terminal to ensure that there is enough space to accommodate the increased number of facilities and passengers. Simply adding more counters without expanding the terminal area could lead to overcrowding and reduced efficiency. Therefore, a comprehensive approach that includes both the addition of counters and the expansion of terminal space is essential for optimizing passenger flow and improving service delivery.

Beyond expanding the number of check-in counters, other strategies could be implemented to further enhance passenger processing and service quality. These include optimizing queue management to reduce wait times, increasing the number of self-check-in kiosks to provide passengers with more options, and utilizing terminal space more effectively to ensure smooth passenger movement. Additionally, better management of check-in staff service times could improve efficiency and help prevent bottlenecks during peak hours. Implementing a combination of these strategies would not only alleviate congestion but also contribute to a more seamless and satisfying passenger experience. However, it should be noted that while these additional solutions are viable and could provide substantial benefits, they fall outside the specific scope of this research. Future studies could explore these options in greater detail to provide a more comprehensive approach to managing airport capacity and improving passenger service standards at El Tari Kupang Airport.

4. CONCLUSION

Based on the analysis of the check-in counter planning at El Tari Kupang Airport until 2045, it is predicted that the number of passengers will reach 8.945.600, with peak hour passengers totaling 4.473. To accommodate this increase, an additional 44 check-in counters will be required, bringing the total to 64 counters by 2045. Although the current capacity (in 2024) is adequate, this expansion is necessary to meet the standards of PM 41 of 2024 and to prevent queue congestion.

5. SUGGESTION

The recommendations based on the research findings for development steps are as follows: First, the results of the capacity analysis and planning for the addition of check-in counters at the departure terminal can serve as a benchmark for the management of El Tari Airport, Kupang, in developing check-in facilities for the next 27 years. Second, planning for the addition of check-in counters should consider the size of the departure terminal, and the airport management might evaluate these plans alongside other alternative solutions proposed by the author. Lastly, future researchers aiming to develop this study should consider introducing new innovations by investigating the expansion of the area to better align with the planned development for El Tari Airport, Kupang, and use more recent passenger movement data to ensure more accurate planning in the post-pandemic context.

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