

# Airport Infrastructure Development Strategy To Increase The Number Of Airlines At Tampa Padang Airport, West Sulawesi Province

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(Received: 15 April 2026; Reviewed: 20 April 2026; Accepted: 1 Mei 2026)

## Abstract

**Airport Infrastructure Development Strategy to Increase the Number of Airlines at Tampa Padang Airport, West Sulawesi Province.** This study aims to formulate an effective airside infrastructure development strategy at Tampa Padang Airport (Class II Airport, Category 4C) to attract new airlines and support the economic potential of West Sulawesi. Using a qualitative descriptive method with SWOT analysis (IFAS and EFAS matrices) as the main strategic analysis tool, the results show that the airport is internally in a strong position (IFAS score: 3.68), supported by qualified human resources and adequate apron capacity. However, several critical weaknesses remain, namely the limited Taxiway Light System, the absence of a Precision Navigation System (ILS/PBN), and a PCN value that restricts larger or heavier aircraft. Externally, the airport is in a very favorable position (EFAS score: 3.91), driven by the potential recovery of the air transport market (LLAU) and strong tourism potential. The biggest threat is the difficulty of land acquisition for runway extension. The most effective development approach is an intensive strategy (SO strategy). Key recommendations include: (1) increasing the PCN and runway pavement strength to accommodate Code 4 aircraft (B737 series); (2) total rehabilitation of the Taxiway Light System and installation of ILS/PBN; and (3) acceleration of land acquisition to realize runway extension in accordance with the Master Plan.

**Keywords:** Airside Infrastructure, Development Strategy, SWOT Analysis, Tampa Padang Airport

## INTRODUCTION

Airports are strategic nodes within the air transportation system that function as connectors of various flight networks and routes, supporting passenger mobility and cargo distribution (Jumawan & Susanto, 2023). Airports not only serve as transportation facilities but also act as drivers of economic activities that promote growth, stability, and integration between national and regional development (Jumawan & Susanto, 2023). In addition, airports serve as intermodal hubs that connect air transportation with other modes of transport in an integrated and efficient system (Jumawan & Susanto, 2023).

However, airport infrastructure development still faces several key issues, particularly related to the mismatch between infrastructure capacity and operational needs of air transportation. Limitations in airside facilities such as runways, taxiways, and aprons can affect service capacity and operational efficiency. Furthermore, suboptimal infrastructure quality and service performance may reduce the attractiveness of airports for airlines. Previous studies indicate that infrastructure quality and service performance significantly influence the operational performance of air transportation systems (Tukimun, 2022).

Moreover, airline decisions to open new routes or increase flight frequencies are strongly influenced by airport infrastructure conditions. Inadequate infrastructure can lead to operational inefficiencies and reduce airport competitiveness. Conversely, proper infrastructure development can enhance regional connectivity and contribute positively to regional economic growth (Sudaryanto & Timbulan, 2019). This indicates that airport infrastructure development plays a strategic role in supporting regional development.

In the local context, Mamuju Regency has considerable geographical and economic potential that can be developed through the air transportation sector. Tampa Padang Airport, as a Class II airport, has a terminal capacity of up to 500,000

passengers per year; however, its utilization level remains relatively low. This condition indicates a gap between existing infrastructure capacity and the number of airlines and flight operations served. Therefore, more targeted development strategies are needed to optimize the utilization of available infrastructure.

In addition to economic impacts, the presence of an airport also affects the social conditions of surrounding communities by creating business opportunities and improving welfare. The development of air transportation infrastructure has been shown to stimulate local economic activities and diversify livelihoods (Lilianti & Abdul Halim, n.d.). Based on these conditions, this study is important to analyze airport infrastructure development strategies to increase the number of airlines operating at Tampa Padang Airport and to provide relevant recommendations for effective and sustainable airport management.

## METHODS

### Type of Research

This study used a qualitative descriptive approach. The researcher served as the main instrument, and data collection techniques were carried out through triangulation, including observation, interviews, and documentation. The data collected were predominantly qualitative, and data analysis was conducted inductively.

### Research Location

Tampa Padang Airport is located in Mamuju Regency, West Sulawesi Province, and has a strategic role in supporting regional connectivity. The overview of the research location is presented in Figure 1.



Figure 1. Map of Tampa Padang Airport

Furthermore, the existing condition of the airport can be observed through the layout, which illustrates the main facilities such as the runway, taxiway, and apron as the basis for infrastructure analysis. The layout is shown in Figure 2.

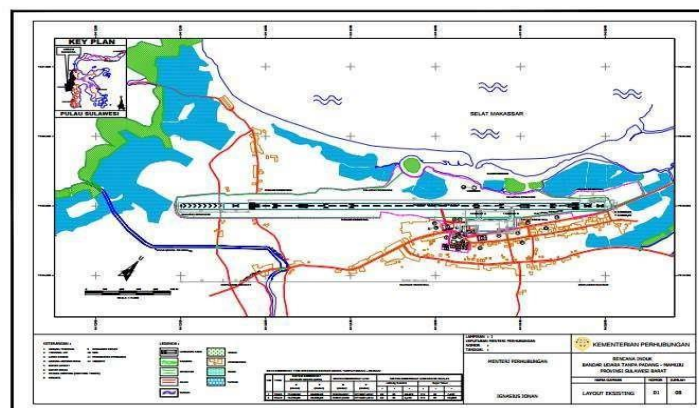


Figure 2. Layout of Tampa Padang Airport (Directorate General of Land Transportation, 2024)

### Research Method

Qualitative and quantitative analyses were used to process the data. The qualitative analysis evaluates the condition of airport infrastructure, including strengths, weaknesses, opportunities, and threats through the SWOT (Strengths, Weaknesses, Opportunities, and Threats) approach, as well as the IFAS (Internal Factor Analysis Summary), EFAS (External Factor Analysis Summary), IE (Internal–External), and SWOT quadrant matrices. IFAS is used to identify and assess internal factors in terms of strengths and weaknesses, while EFAS is used to analyze external factors, namely opportunities and threats. The results of these analyses are then mapped into the Internal–External (IE) matrix to determine the strategic position of the organization, and subsequently formulated into the SWOT quadrant matrix to generate the most appropriate strategic alternatives based on the combination of internal and external factors.

### Data Collection Methods

Data were collected in the following ways:

1. Interview  
This study used semi-structured interviews. The purpose of these interviews was to identify problems more openly, in which the interviewees were asked to share their opinions and ideas.
2. Literature Review  
In this stage, the researcher reviewed literature, regulations, guidelines, and previous studies related to the subject under discussion.
3. Documentation  
Written investigation methods, such as books, magazines, documents, regulations, photographs, diaries, websites, and other written sources.
4. Observation  
To collect information from events through direct observation. This method was used to ensure that the expected research results could be obtained.
5. Questionnaire  
The questionnaire consisted of a list of statements related to the research problem and had to be answered by the respondents.

### Types of Data

The data used as the basis for writing this final project were:

1. Primary data related to Tampa Padang Airport to improve traffic and encourage business growth.
2. Secondary data such as journals, internet sources, and others.

### Flowchart

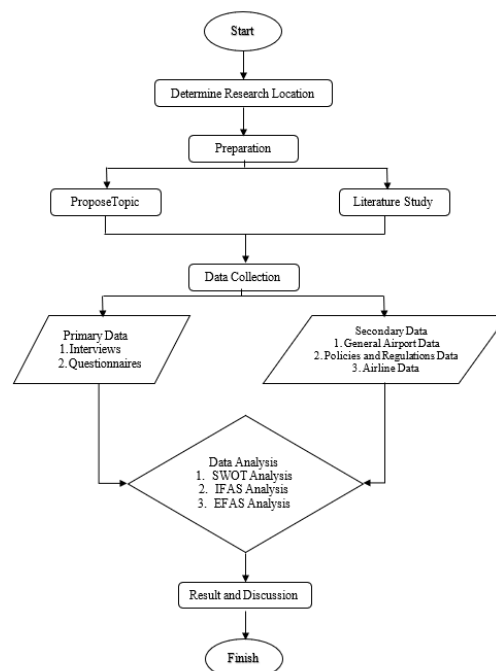


Figure 3. Research Flowchart

## RESULTS AND DISCUSSION

### Infrastructure Conditions at Tampa Padang Airport

This study involved several key informants whose positions were highly relevant to the topic under investigation, using interview documents that presented a structured data collection framework for research on the infrastructure development strategy of Tampa Padang Airport in the context of increasing the number of airlines in West Sulawesi. To obtain holistic information, the study involved five main units as interview respondents, each with specific roles and expertise. The respondents were grouped according to their areas of specialization, starting with the Airport Infrastructure and Engineering Section, which provided detailed data on the physical condition of airside facilities such as runway PCN, taxiway, apron, runway strip, and RESA. Next, the Air Navigation Section provided insight into technological and operational aspects, particularly the importance of implementing ILS or PBN to increase the airport’s attractiveness.

The study also considered RESA and FOD cleaning systems, as well as the role of ARFF facilities in convincing airlines to operate. Meanwhile, the Airport Operations Section provided detailed responses regarding day-to-day operations, including aircraft ground movements, turnaround efficiency, and the condition of the taxiway and apron. Finally, the head of the airport operating unit (UPBU) was interviewed as the top leader with a comprehensive overview of managerial aspects, operational challenges, and overall infrastructure development strategies. Thus, this plan ensured that the collected data covered the technical, operational, safety, and strategic dimensions crucial for formulating airport development strategies.

In addition to interviews, this study also used questionnaires as an instrument to analyze the infrastructure development strategy of Tampa Padang Airport in an effort to increase the number of airlines in West Sulawesi, using SWOT analysis as the methodological framework. The questionnaire was divided into two main sections aimed at collecting quantitative expert perception data. This section served as the basis for preparing the IFAS and EFAS tables based on respondents’ assessments. The assessment sections are as follows.

**Table 1.** Research Questionnaire

Research Item	Assessment (Rating)					Description
	Very Poor	Poor	Fair	Good	Very Good	
Current Infrastructure Conditions						Items evaluated in this section include the Runway, including surface condition, length, width, and pavement strength (PCN), as well as the condition of the Taxiway and Apron (aircraft parking area).
Infrastructure Development Strategy	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	This strategy focuses on four aspects: Infrastructure Improvement (runway, PCN, drainage), Safety (RESA/strip, ARFF, FOD), and Service/Attractiveness (hangar, cargo, modern navigation).

This questionnaire became an important instrument for collecting comprehensive empirical data from airport experts, which was used as the basis for formulating infrastructure development strategies within the SWOT analysis framework. Through the synergy of field data and expert statements in Table 2 below, this chapter describes in detail the condition of airside infrastructure including the runway, taxiway, apron, and other supporting facilities. The results of this analysis then became the empirical basis for formulating development strategies in the following chapter.

**Table 2.** Research Questionnaire

Respondent	Position	Description
Dedy Wahyuddin	Flight Evaluator	analyzes and assesses flight operational performance, including safety aspects, departure/arrival time efficiency, and compliance with flight procedures.
Fajar Purnomo	Flight Evaluator	Similar to other flight evaluators, he is involved in the routine control and assessment of flight operations.
Fakhry Ramadhan	Flight Technician	Responsible for the maintenance and repair of aviation technical equipment and airport facilities, especially those related to electrical, mechanical, and navigation systems (such as runway lights, taxiway lights, and navigation equipment).
Ris Bitti Kaka	Flight Technician	Responsible for maintaining the reliability and safety of aviation equipment and airside facilities.

## Development Strategy Analysis

The descriptive and factual field research results were presented in the previous discussion by mapping the physical condition, technical dimensions, and operational reliability of the airside infrastructure at Tampa Padang Airport. Observation data, in-depth interviews, and a review of important documents such as Master Plan KP 776, AIP WAFJ, and CASR 139 standards provided an empirical picture of the existing infrastructure capability.

### Internal Environment Analysis (Internal Factor Analysis Summary / IFAS)

The IFAS matrix was prepared by assigning weights based on the relative importance of each factor to airport success (total weight = 1.00). Ratings (scale 1-5) were obtained from the average questionnaire responses, where ratings of 3.00 and above were categorized as Strengths (S), and ratings below 3.00 were categorized as Weaknesses (W). Weighted scores were obtained by multiplying the weight by the rating.

**Table 3.** Internal Factor Analysis Summary (IFAS)

Internal strategic factors	Weight	Rating	Weighted Score	Description
<b>Strength (S)</b>				
Availability of qualified human resources (ATC, technicians)	0.14	5.00	0.70	Highly qualified human resources are a core airport strength, ensuring operational compliance and efficiency in aircraft handling.
Apron capacity (number of parking stands)	0.11	4.80	0.53	High and adequate apron capacity is a strength that allows the airport to accommodate more aircraft and minimize delays.
Adequate taxiway number & width	0.10	4.60	0.46	Good taxiway design and condition support smooth aircraft movements to and from the runway.
Runway aspects (surface condition, length, width)	0.12	3.40	0.41	The current runway dimensions and surface condition are considered adequate to serve the types of aircraft currently in operation.
Availability and condition of RESA	0.05	3.40	0.17	Adequate RESA (Runway End Safety Area) condition is a strength in terms of flight safety.
Taxiway lighting system not fully functional (60%)	0.12	2.00	0.24	Critical weakness. A lighting system that is not fully functional threatens taxiing safety at night and in low-visibility conditions, and also limits airport operations.
Limited precision navigation system (ILS/PBN)	0.15	2.50	0.38	The absence or limitation of precision navigation aids is a weakness that hampers flight operations during bad weather.
PCN (Pavement Classification Number) limitation	0.08	2.20	0.18	The current runway pavement strength is not yet optimal for accommodating wide-body or heavier aircraft, limiting market potential.
Taxiway lighting system functions well (previously)	0.13	4.60	0.60	This factor came from the initial questionnaire results and is contradictory to the observation findings (W6). Its high rating (4.60) is recorded, but it is superseded by the more specific W6 finding (score 2.00).
<b>Total</b>	<b>1.00</b>		<b>3.68</b>	

Based on the calculation results of the Internal Factor Analysis Summary (IFAS) matrix summarized in the table above, the total weighted score was 3.68. This value is above the neutral point of 3.00, which academically indicates that the internal strategic position of Tampa Padang Airport falls into the Strong category. The airport's internal capabilities, especially those related to human resources and physical airside capacity, constitute a solid foundation for implementing the development plan. The airport's strengths must be utilized to the fullest extent; however, the development strategy must also be directed toward eliminating these critical technical weaknesses so that Tampa Padang Airport can meet the highest operational standards required to attract new airline operators.

### 1. External Environment Analysis (External Factor Analysis Summary / EFAS)

The EFAS matrix maps external factors, namely Opportunities that should be utilized and Threats that should be avoided or minimized, which are relevant to efforts to increase the number of airlines at Tampa Padang Airport.

**Table 4.** External Factor Analysis Summary (EFAS)

External strategic factors	Weight Rating Weighted Score			Description
<b>Opportunity (O)</b>				
Market recovery potential (LLAU)	0.18	4.60	0.83	The rebound trend in passengers (from 43K to 55K) shows strong market demand after the crisis. This is a key signal for airlines to increase frequency.
Potential of West Sulawesi economic and tourism sectors	0.17	4.80	0.82	West Sulawesi has strong potential in agriculture, plantations (cocoa/palm oil), and fisheries, creating stable demand for cargo logistics and business/technical travel. In addition, the natural tourism potential of Mamuju and surrounding areas is an attractive leisure market.
Regional government support	0.12	4.60	0.55	Political and fiscal support from the regional government is very important as a catalyst to accelerate licensing, project funding, and new route promotion.
Improvement of ARFF facilities and procedures	0.08	4.60	0.37	Improved safety service quality (ARFF) is an opportunity to attract airlines by ensuring the highest safety standards.
<b>Threats (T)</b>				
Difficulty in land acquisition and residential areas	0.20	2.00	0.40	Social and legal obstacles in land acquisition are major risks that can delay or derail airport physical expansion projects (such as runway extension).
Market fluctuations and competition	0.07	2.20	0.15	External threats in which macroeconomic factors and fluctuating ticket prices may cause airlines to reduce frequency.
Increase in runway pavement strength (PCN)	0.08	3.80	0.30	The urgent need to improve PCN is a threat that limits the airport from serving wide-body aircraft and hinders market growth.
Improvement of the drainage system across the airside area	0.10	4.60	0.46	Operational threat. Drainage system failure can cause standing water, damage pavement, and disrupt operational safety.
<b>Total</b>	<b>1.00</b>		<b>3.79</b>	

Based on the calculation results of the External Factor Analysis Summary (EFAS) matrix summarized in the table above, the total weighted score obtained was 3.91. This value is significantly above the neutral point of 3.00, which academically indicates that Tampa Padang Airport operates in a highly favorable external environment and has a strong capacity to respond to external factors. This analysis shows that there is a very large market opportunity that must be utilized immediately. The main opportunity lies in the potential recovery of the LLAU market (score 0.83), supported by the economic potential of the West Sulawesi region (score 0.82), especially in the agricultural, plantation, and tourism sectors, all of which require reliable air connectivity for business mobility, technicians, and cargo logistics. The support of the regional government (score 0.55) further strengthens the airport’s capacity to turn this market potential into concrete action.

**2. Determination of the Airport’s Strategic Position**

a. Calculation of SWOT Quadrant Matrix Coordinates

**Table 5.** Calculation of Total IFAS Score (Internal)

Component	Factor	Weighted Score
Strengths (S)	S1 s/d S5, S9	0.70 + 0.53 + 0.46 + 0.41 + 0.17 + 0.60
	Total Strengths (S)	2.87
Weaknesses (W)	W6, W7, W8	0.24 + 0.38 + 0.18
	Total Weaknesses (W)	0.80

Based on the quantitative calculation of the Internal Factor Analysis Summary (IFAS) matrix, the total weighted score of Tampa Padang Airport is 3.68. This value comes from a Total Strength score of 2.87, which far exceeds the Total Weakness score of 0.80. This difference yields an X-axis (Internal) coordinate of +2.07. The positive X-axis value of +2.07 clearly indicates that Tampa Padang Airport has dominant internal advantages. The main strengths lie in the availability of competent human resources and adequate airside capacity, especially apron capacity and taxiway dimensions that support aircraft movement efficiency.

**Table 6.** Calculation of Total EFAS Score (External)

Component	Factor	Weighted Score
Opportunities (O)	O1 s/d O4	0.83 + 0.82 + 0.55 + 0.37
	Total Opportunities (O)	2.57
Threats (T)	T5 s/d T8	0.40 + 0.30 + 0.15 + 0.46
	Total Threats (T)	1.31

Based on the quantitative calculation of the External Factor Analysis Summary (EFAS) matrix, the total weighted score obtained is 3.91. This value comes from a Total Opportunity score of 2.57, which is substantially greater than the Total Threat score of 1.31. This difference yields a Y-axis (External) coordinate of +1.26. The positive Y-axis value of +1.26 clearly indicates that the external environment of Tampa Padang Airport is dominated by opportunities. These opportunities stem from factors that directly attract airlines, namely the strong post-crisis recovery potential of LLAU (O1) and the economic potential of the West Sulawesi region (O2), including primary sectors and tourism, which create stable demand for business travel and logistics.

**b. Internal-External (IE) Matrix**

The position in the IE matrix is determined based on the total weighted IFAS and EFAS scores:

1. X-axis (IFAS Axis - Internal): IFAS Score = 3.68 Category: Strong (3.0 - 5.0)
2. Y-axis (EFAS Axis - External): EFAS Score = 3.91 Category: High (3.0 - 5.0)

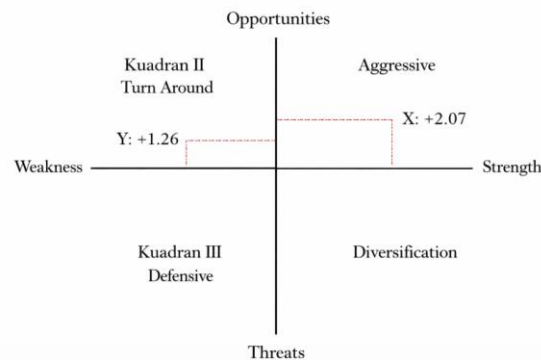
**Table 7.** Internal-External (IE) Matrix

EFAS Score	Strong (3.0-5.0)	Average (2.0-2.99)	Weak (1.0-1.99)
High (3.0-5.0)	Quadrant I: Grow & Build	Quadrant II: Grow & Build	Quadrant III: Hold & Maintain
Medium (2.0-2.99)	Quadrant IV: Hold & Maintain	Quadrant V: Hold & Maintain	Quadrant VI: Harvest & Diversify
Low (1.0-1.99)	Quadrant VII: Hold & Maintain	Quadrant VIII: Harvest & Diversify	Quadrant IX: Harvest & Diversify

Based on the coordinate mapping (IFAS: 3.68; EFAS: 3.91) in the Internal-External matrix, Tampa Padang Airport is clearly positioned in Quadrant I (Grow and Build Strategy). This position confirms that the airport has very strong internal strengths (3.68) and operates in an external environment rich in opportunities (3.91), driven by the recovery potential of LLAU and the regional economic sector. The strategic implication of Quadrant I is an aggressive strategy, in which the airport should focus on intensive, vertical, horizontal integration and diversification strategies to use its competitive advantages to maximize market opportunities. This strategy should become the basic framework for formulating actions in the Alternative Strategy Matrix (advanced SWOT).

**c. SWOT Quadrant Visualization**

The airport is located at coordinates (X: +2.07; Y: +1.26), placing it in Quadrant I (Aggressive).



**Figure 4. SWOT Quadrant**

d. Strategic Conclusion of the SWOT Quadrant Matrix

The calculated coordinates of the SWOT Quadrant Matrix yield  $X = +2.07$  and  $Y = +1.26$ . Since both values are in the positive area, the strategic position of Tampa Padang Airport is clearly in Quadrant I, namely an Aggressive Strategy (Growth and Build).

e. Alternative Infrastructure Development Strategy Matrix

Based on the formulation results of the Alternative Strategy Matrix (advanced SWOT matrix), it is concluded that the infrastructure development strategy of Tampa Padang Airport clearly falls within the corridor of an Aggressive Strategy (Quadrant I). This strategy requires a proactive and expansive approach, in which the airport must fully leverage its internal strengths, such as the quality of human resources and adequate apron capacity, to exploit external opportunities in the form of recovery in air transport traffic (LLAU) and the regional economic potential of West Sulawesi.

The main priority action is summarized in Strategy SO-1, namely immediately using the momentum of market demand and government support to realize investment in increasing the PCN and modernizing Precision Navigation technology. The implementation of these two infrastructure projects is key to removing operational limitations that hinder the entry of larger-capacity aircraft and new airlines.

## CONCLUSION

Based on the results of the analysis of internal and external factors as well as the formulation of the Alternative Strategy Matrix in the effort to develop the infrastructure of Tampa Padang Airport to increase the number of airlines, the following conclusions were obtained:

1. Airport Strategic Position

Internal and External Conditions: The Internal Factor Analysis Summary (IFAS) matrix produced a total weighted score of 3.68, indicating that Tampa Padang Airport has strong internal strengths in terms of human resources and adequate airside capacity. Meanwhile, the External Factor Analysis Summary (EFAS) analysis produced a total weighted score of 3.91, indicating that the airport is in an opportunity-rich external environment, driven by the recovery potential of air transport traffic (LLAU) and the regional economic sector of West Sulawesi. General Strategy Determination: The airport's strategic position plotted on the Internal-External (IE) Matrix is at coordinates (IFAS: 3.68; EFAS: 3.91), namely in Quadrant I (Grow and Build). This result is confirmed by the SWOT quadrant calculation at coordinates ( $X: +2.07$ ;  $Y: +1.26$ ), which places the airport in an Aggressive Strategy position.

2. Most Effective Infrastructure Development Strategy

Technical Investment Priorities (SO-1 & WO-1 Strategy): The most effective strategy is to make urgent investments to address the main technical barriers for airlines. This includes increasing the PCN (Pavement Classification Number) and implementing Precision Navigation technology (such as ILS/PBN). These investments have a dual objective: eliminating operational weaknesses and meeting the requirements of larger-capacity aircraft needed by the regional economy.

Mitigation of Critical Non-Technical Threats (ST-1 Strategy): The airport must prioritize resolving land acquisition issues for development areas. Resolving land problems is a fundamental key to enabling the realization of runway extension according to the Master Plan, which serves as a long-term confidence signal for prospective major airlines.

Operational Reliability Assurance (WT-1 Strategy): To ensure operational reliability and safety, which are primary requirements for airlines, an effective strategy must include the submission of an emergency budget for the total

repair of Taxiway Lights (W6), whose functionality has declined, as well as comprehensive improvements to the drainage system (T8) to prevent operational disruptions.

## RECOMMENDATIONS

### 1. Short-Term Infrastructure Development (1-2 Years)

**Navigation and Safety Budget Priorities:** Airport management is advised to immediately prepare a strong technical proposal, supported by market potential data (LLAU and the West Sulawesi economy), to secure a special budget allocation for the procurement and installation of Precision Navigation technology (ILS/PBN) as well as the total repair of the Taxiway Light System.

**Drainage Improvement:** Carry out a comprehensive evaluation and improvement of the airside drainage system. Success in this improvement will mitigate high operational risks (threat score 0.46) and ensure runway quality.

**Capacity Marketing Program:** The airport should utilize its existing apron capacity strength to establish proactive communication with airlines, offering the fastest turnaround time as an operational incentive.

### 2. Medium-Term Strategic Development (3-5 Years)

**PCN Improvement Focus:** Gradually or simultaneously realize runway PCN improvement so that the airport can serve larger cargo and passenger aircraft (for example, Boeing 737-800 NG or heavy A320), which is essential to support the West Sulawesi economy.

**Land Acquisition Cooperation:** The Regional Government and UPBU are advised to form a special working team to intensively resolve land acquisition issues that hinder runway expansion. Resolving threat T5 should become a key strategic performance indicator for the airport in the medium term.

**Air Cargo Development:** Considering the potential of the primary sector (fisheries/agriculture), the airport is advised to include Air Cargo Facility Development in the next Master Plan as an additional attraction for cargo-carrying airlines, which will indirectly increase passenger flight frequency.

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