

Formulation of Corporate Strategy Warehouse Cargo Terminal PT. ABP Uses AHP and QSPM Method at Halim Perdana Kusuma Airport

Mercya Salsabillah Shani^{1,2*}, Udisubakti Ciptomulyono³

ABSTRACT

The warehousing industry is one of the backbones of logistics operations, involving several activities such as storage, receipt, collection, and delivery of goods or cargo. Common warehousing problems include fluctuating conditions or uncertain demand, varying labor requirements and costs, and inaccurate inventory information. All of these issues require a robust systems solution to keep managers informed of changes and aware of areas that need attention. This study utilizes qualitative and quantitative research, employing data interviews and questionnaires that are processed into numerical data using internal and external condition variables of the company. The methods used are the AHP and QSPM methods, with AHP serving as the weighting of criteria to determine ranking criteria hierarchically, and the QSPM method serving for strategic evaluation of the ranking criteria from its key factor produced by the AHP method based on the company's internal and external factors. In this research, the highest and most suitable strategy for the company was formulated based on the distribution of questionnaires using purposive sampling to 8 key person respondents who have a role in the company. The top 3 strategies out of the 9 proposed strategies were identified using the Analytical Hierarchy Process (AHP) pairwise comparison method. Subsequently, the QSPM method weighted the alternative strategies based on internal and external factors, and the strategy with the highest Total Attractiveness Score (TAS) of 5.947 was identified as utilizing sensor technology (RFID) to accurately and automatically track each package or cargo in motion

KEYWORDS: Warehouse Industry, Cargo, AHP, QSPM

¹IDS Medical Systems (idsMED), Jakarta, Indonesia

²Technomarketing, Interdisciplinary School of Management and Technology, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

³Department of Industrial and System Engineering, Institut Teknologi Sepuluh Nopember, Surabaya, Indonesia

*Corresponding author: mercyashani44@gmail.com

1. INTRODUCTION

The warehousing industry plays a crucial role in logistic operations, encompassing various activities such as storage, receiving, picking, and shipping of goods or cargo. According to Yolanda Ulfa Sari (2015), cargo is defined as all goods transported by air, sea, or land, typically for trading purposes, either domestically between regions and cities or internationally, commonly known as export-import (Anggraeni & Rachmawati, 2022) Current challenges faced by cargo products include fluctuating market conditions and uncertain demands, varying labor requirements and costs, and inaccurate inventory information, all of which necessitate robust systemic solutions to enable managers to stay informed about changes and address critical gaps.



FIGURE 1. Global Cargo Ton Kilometers Graph from 2017 to 2023

PT. Ardhya Bumi Persada, also known as Ardhya Warehouse, is a company primarily involved in terminal cargo warehousing. Established in 2017, the company operates its cargo terminal services at Halim Perdana Kusuma Airport in Jakarta. PT. ABP strives to provide top-notch services through a one-stop cargo process, covering all aspects from upstream to downstream in handling aircraft cargo.

Despite its advantages, several shortcomings require management's attention for improvement, including the company's capacity to handle large quantities of goods simultaneously, leading to potential overcarriage issues and other cargo handling challenges. In 2021, the cargo load reached 11,966,723 colly, which significantly decreased to 4,302,822 in 2022, and further declined to 2,852,666 by April 2023, indicating a substantial drop compared to 2021.

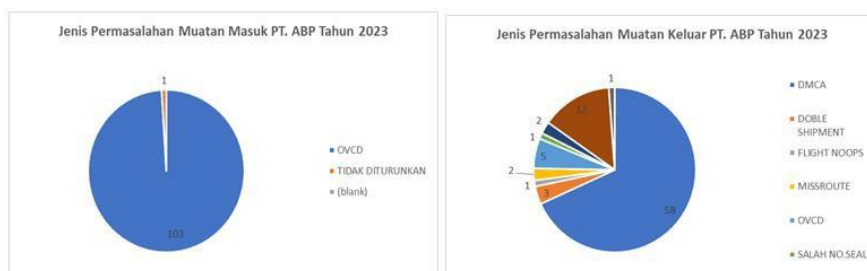


FIGURE 2. Common problem of ingoing and outgoing cargo at PT. ABP in 2023

Considering the various challenges faced by PT. ABP in terms of management and cargohandling, a business strategy formulation is necessary to assist management in achieving sustainable internal performance improvements and conducting business activities more effectively and efficiently.

Management strategy methods are widely employed by researchers and companies to assist businesses in attaining competitive advantages in the market. According to Fred R. David, the concept of strategic management involves the analysis of external and internal environments, strategy formulation, strategy implementation, and strategy evaluation and control. The Analytic Hierarchy Process (AHP) is the most extensively used multi-criteria method in research. This technique combines alternative ranking and aggregation processes to identify the most relevant alternatives.

Previously (Abdul Malik et al., 2013) conducted research on the integration of strategic planning in Saudi Arabia's education system using AHP and Quantitative Strategic Planning Matrix (QSPM). His integrated model showed significant improvements by combining AHP with the development of QSPM. Additionally, David (2011) emphasized the effectiveness of strategic planning through the development of EFE Matrix and IFE Matrix, followed by SWOT analysis and, finally, QSPM. In this study, QSPM will be utilized to select the most suitable strategies through a quantitative approach, impacting the company from both internal and external factors.

Therefore, based on the aforementioned background and previous research recommendations, this study aims to combine the AHP and QSPM methods to perform a structured analysis of strategic decision-making in the warehouse industry of PT. Ardhya Bumi Persada. The objective is to contribute to enhancing the company's performance effectiveness, ensuring its sustainability, and ultimately increasing its corporate value.

2. LITERATURE REVIEW

Stages of Management Strategy

According to Fred R. David, the management strategy process consists of three stages: strategy formulation, strategy implementation, and strategy evaluation (Anggraeni & Rachmawati, 2022) The formulation stage, also known as strategy identification, is divided into three parts: the input stage, matching stage, and decision stage. In this stage, opportunities and external threats to the organization are identified, internal strengths and weaknesses are determined, long-term objectives are established, strategic alternatives are generated, and specific strategies are selected for pursuit.

Moving on to the strategy implementation stage, the following activities are undertaken: developing strategies that support the organizational culture, planning an effective organizational structure, reorganizing marketing efforts, preparing budgets, developing and utilizing information systems, and linking employee compensation to organizational performance.

Lastly, the strategy evaluation stage involves three fundamental activities: reviewing the internal and external factors that form the basis for the current strategy, measuring performance, and taking corrective actions.

IFE & EFE Matrix

The IFE Matrix (Internal Factor Evaluation) is a strategic analysis tool used to assess internal factors influencing the performance of an organization. This matrix aids in identifying the internal strengths and weaknesses of a company concerning key factors that impact organizational performance. It assigns weights to each factor based on its level of importance. In relation to strategy formulation, the EFE Matrix (External Factor Evaluation Matrix) shares the same purpose and explanation as the IFE Matrix. It serves as a tool in strategic analysis to evaluate external factors affecting the performance of an organization. The EFE Matrix is designed to identify the opportunities and threats posed by the external environment to the company.

SWOT Matrix

According to Ferrel and Harline (2005), SWOT analysis is a method used to gather information from situational analysis and categorize it into internal issues (strengths and weaknesses) and external issues (opportunities and threats). Kotler (2009) defines SWOT analysis as an evaluation of overall strengths, weaknesses, opportunities, and threats. This analysis is based on the assumption that an effective strategy will minimize weaknesses and threats.

AHP Model

The AHP (Analytic Hierarchy Process) method assists in translating rational and irrational intuitions in uncertain and complex settings (Ciptomulyono, 2008). The AHP method is commonly used in decision-making involving multiple criteria, prioritizing strategies, and allocating resources. The AHP presents a method to facilitate decision-making by arranging perceptions, emotions, evaluations, and recollections into a multi-level hierarchical structure that reveals the factors impacting a decision (Saaty, 2005) This approach offers a structured framework for establishing priorities at each level of the hierarchy, employing pair-wise comparisons quantified on a scale from 1 to 9 (Saaty, 2005)

QSPM Matrix

The formulation of marketing strategies using the QSPM method involves three stages of data analysis:

Firstly, during the input stage, data identified through field observations are summarized in matrices known as the External Factor Evaluation (EFE) and Internal Factor Evaluation (IFE) matrices. Secondly, in the matching stage, an analysis process is conducted to formulate company strategies through two steps: the IE Matrix positions a company within a nine-cell matrix, and the SWOT matrix serves as an essential matching tool to aid managers in developing four types of strategies (Purwanto, 2008). Lastly, the decision stage employs the QSPM matrix. The QSPM matrix represents the final stage

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within the framework of strategy formulation analysis. This technique clearly indicates the most favorable alternative strategies to be chosen (Purwanto, 2008).

3. METHODS

This research is a case study of the cargo terminal business of PT. ABP located at Halim Perdana Kusuma Airport in Jakarta province from 2021 to 2023. Data analysis was conducted at PT. ABP, Jakarta. The data used in this study consists of primary and secondary data. Primary data were obtained through direct interviews and observations. Interviews were conducted with 8 informants, including 4 internal staff members of PT. ABP and 4 field workers. These 8 informants included individuals involved in the management such as division coordinators, general manager, CEO, and field worker coordinator. The interviews aimed to explore the informants' perceptions of internal and external factors influencing the performance system at PT. ABP and to understand their perceptions regarding the weight and rating of internal and external factors influencing the performance system at PT. ABP.

The initial stage involved the analysis of Internal Factor Evaluation (IFE) and External Factor Evaluation (EFE) matrices to identify the company's internal and external conditions. Subsequently, in the matching stage, an analysis of the IE (Internal-External) matrix and SWOT (Strengths, Weaknesses, Opportunities, and Threats) was conducted to determine what kind of strategies the company needs based on the research findings and to propose various alternative strategies.

After obtaining alternative strategies, the decision stage was carried out, and Analytical Hierarchy Process (AHP) was used for ranking. In this AHP stage, the same respondents were surveyed to determine the best alternative strategy. The data collected through the questionnaire survey was processed using Expert Choice 11 software. The results of pairwise comparisons between strategies were ranked, and the top three alternatives were selected.

Subsequently, the Quantitative Strategic Planning Matrix (QSPM) method was employed to strengthen the AHP method based on quantitative data and to consider the attractiveness of each strategy in relation to the company's internal and external factors. The final stage involved analyzing the results, drawing conclusions, and providing recommendations.

4. RESULTS

Result from the designated methods based from the stages of management strategy shown below:

Internal Analysis

Internal analysis is conducted to measure the strengths and weaknesses of each factor, as well as their weighting. At the beginning of the research, this analysis was carried out through literature study and journal references on logistics, which served as

the primary sources in formulating these factors. These factors include resource, management, marketing, financial, technology and information factors.

External Analysis

External analysis outlines the opportunities and threats for PT. ABP. initiated the same as internal analysis by using journal references and company conditions. the measurements encompass various factors including economic factors, marketing factors, political factors, government and legal factors, technological factors, and competitive factors.

IFE Matrix (Internal Factor Evaluation)

The analysis conducted for the internal and external factors can identify the extent of interrelated strengths, weaknesses, opportunities, and threats. The criteria from the internal and external factors were carried out from the internal external analysis. Discussions and questionnaire to 8 respondents were done to identify the most related internal external factor from the internal external analysis and weighting is carried out on each criterion in the factor. Eventually, the total score point of the IFE matrix is determined by formulating the average from the responses of the 8 respondents, yielding the following results (Setyorini & Santoso, 2016).

TABLE 1. Matrix IFE (Internal Factor Evaluation)

	Internal Factor	Quality	Rating	Value
Strength				
1	High level of competence of the workforce to process logistics services	0.18125	3.25	0.589063
2	Terminal capacity to handle cargo volumes that are qualified in quality and quantity	0.1125	3.5	0.39375
3	Have high quality and responsive customer service	0.13125	3.375	0.442969
4	Mastering effective operational handling activities and qualified company assets	0.1375	3.375	0.464063
5	Have good knowledge and understanding of market potential	0.1125	3.125	0.351563
Weakness				
1	The financial reporting or recap system is still manual, which leads to missed data	0.085	2.625	0.223125
2	Corporate strategy and policies are still not clear enough	0.075	2.625	0.196875
3	Supervision of goods handling and operational activities such as quality control is still not optimal	0.06875	2.25	0.154688
4	Minimal adaptation of logistics technology, so there is no international standardization	0.05625	2.25	0.126563
5	Shipment and document workflows are still manual, not yet using the system	0.04	2.5	0.1
Total				3.042656

EFE Matrix (External Factor Evaluation)

The analysis of the EFE matrix is the result of identifying external factors in the form of opportunities and threats that influence PT. ABP. The multiplication of the average weighting and rating assessment given by the respondents will produce total scores as shown in the following Table 2

TABLE 2. Matrix EFE (External Factor Evaluation)

	Internal Factor	Quality	Rating	Value
Opportunity				
1	Market share cargo that continues to grow	0.1	3.125	0.3125
2	There are freight forwarder partners to increase customer accessibility	0.15	3.375	0.50625
3	Strategic location and area for portfolio excellence and marketability	0.13125	3.5	0.459375
4	Supportive trade policies and enabling regulations	0.085	3.125	0.265625
5	The more advanced information technology that will help companies to provide services to customers	0.1275	3.25	0.414375
Threats				
1	There is a change in government policy that is not profitable	0.125	1.875	0.234375
2	The number of existing competitors is increasing and growing	0.09375	2.5	0.234375
3	Technological developments are very fast and dynamic	0.075	2.875	0.229688
4	Inadequate security conditions and threats from organized crime and cargo security	0.0875	2.625	0.229688
5	Uncertain and measurable level of consumer consumption.	0.1875	2.875	0.539063
Total				3.41125

IE Matrix (Internal-External)

The IE (Internal-External) matrix is constructed based on the analysis results from the elaborated IFE and EFE matrices. The average value of IFE is 3.04, and the average value of EFE is 3.41. The average values of IFE and EFE are obtained by summing the scores for each factor, where the scores are derived from the multiplication of the average rating and average weighting for each factor. These resulting values indicate the position in Quadrant V of the IE matrix, signifying that the required strategies for the company at present are 'hold' and 'maintain.' According to the research, the forms of 'hold' and 'maintain' strategies are Market Penetration and Product Development, indicating that the company needs strategies to penetrate the market and develop products.

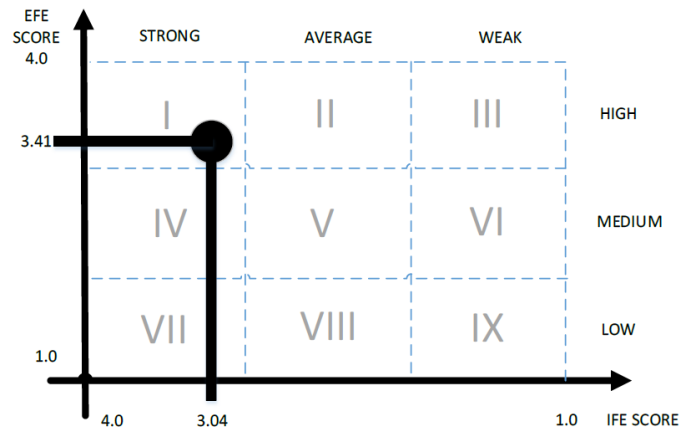


FIGURE 3. IE Matrix

The IE position is at 3.04 (Table 3) and 3.41 (Table 4). Consequently, PT. ABP is located in cell 1 area, projecting a strategy of grow and build. Some actions that Gosimply can undertake include evaluating the potential to lead the market through through Intensive strategies, such as market penetration, market development, or integrative approaches involving vertical and horizontal integration.

SWOT Analysis (Strengths, Weaknesses, Opportunities, Threats)

The SWOT matrix generates several alternative strategies derived from internal and external variables according to the company's position on the IE matrix, i.e., Hold and Maintenance strategies, as shown in Table 3

TABLE 3. SWOT Matrix

SWOT Matrix	Strenght (S1,S2,S3,S4,S5)	Weakness (W1,W2,W3,W4,W5)
Opportunity (O1,O2,O3,O4,O5)	<ol style="list-style-type: none"> 1. Implement or work with partner businesses that utilize advanced TMS (terminal management systems) for operational activities. (AS1) 2. Utilizing sensor technology (RFID) to track accurately and automatically every moving package or cargo (AS2) 	<ol style="list-style-type: none"> 1. Periodic monitoring or auditing of financial reporting by involving external audit parties (AS3) 2. Maximizing collaboration and communication platforms between employees and departments. (AS4) 3. Implementation of quality management systems such as ISO 9001 to ensure quality standards. (AS5)

Threats (T1,T2,T3,T4,T5)	<ol style="list-style-type: none"> 1. Conduct routine online training or certification once every 3 months to refresh knowledge in cargo handling (AS6) 2. Strengthen relations with aviation associations and the government to overcome unfavorable regulations (AS7) 	<ol style="list-style-type: none"> 1. Implement a lean and agile approach to increase internal flexibility. (AS8) 2. Establish a quality monitoring and reporting system to storage. (AS9)
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Alternative Strategy Weighting with AHP Method (Analytical Hierarchy Process)

In this stage, the alternative strategies obtained from the matching stage will be processed using the AHP (Analytical Hierarchy Process) method. Weight calculations will be performed using Expert Choice 11 software. The weighting is conducted by distributing pairwise comparison questionnaires to respondents who are considered experts in their respective fields. The collected data is then processed to obtain the weighting of alternative strategies, which are subsequently ranked based on the highest values. The results of the pairwise comparison calculations are presented in the table below, where the highest values are obtained for alternative strategies 3, 2, and 7:

TABLE 4. AHP weighting on PT AHP with Ranking

AS rank	Strategy	Quality
1	Periodic monitoring or auditing of financial reporting by involving external audit parties (AS3)	0,215
2	Utilizes sensor technology (RFID) to track accurately and automatically every moving package or cargo (AS2)	0,159
3	Strengthen relations with aviation associations and government to overcome unfavorable regulations (AS7)	0,147
4	Conduct routine online training or certification once every 3 months for employees to refresh knowledge in cargo handling (AS6)	0,114
5	Implementing a lean and agile approach to increase flexibility in dealing with market changes (AS8)	0,094
6	Implement or cooperate with partner businesses utilizing advanced TMS (terminal management systems) for operational activities. (AS1)	0,088
7	Implementation of quality management systems such as ISO 9001 to ensure quality standard. (AS5)	0,069
8	Establish a quality monitoring and reporting system to storage. (AS9)	0,065
9	Maximizing collaboration and communication platforms between employees and departments. (AS4)	0,049

TABLE 5. QSPM Stage

No	Alternative Options Strategy
1	Periodic monitoring or auditing of financial reporting by involving external audit parties (AS3)
2	Strengthen relations with aviation associations and the government to overcome unfavorable regulations (AS7)

No	Alternative Options Strategy
3	Utilizes sensor technology (RFID) to track accurately and automatically every moving package or cargo (AS2)

QSPM Methods

At this stage, the process of determining the 3 alternative strategies with the highest weights based on the AHP method is conducted. The QSPM method is an objective technique that can indicate the best alternative strategy. This is because QSPM is capable of evaluating alternative strategies based on previously identified key internal and external success factors (David, 2011)

Table 4.8 shows the results of the alternative strategies with the 3 highest weights obtained through discussions with management and the AHP method.

Based on the processing results using the QSPM method, the alternative strategy with the highest Total Attractiveness Scores (TAS) is alternative strategy 3, which involves utilizing sensor technology (RFID) to accurately and automatically track each package or cargo in motion, with a TAS value of 5.947. The second-ranked strategy is the alternative strategy of strengthening relationships with aviation associations and the government to address unfavorable regulations, with a TAS value of 5.332. Lastly, the third strategy is strategy 1, which involves regular financial reporting monitoring or auditing, with a TAS value of 5.1875.

TABLE 8. Weighting with QSPM Method

Strength		Strategy 1		Strategy 2		Strategy 3	
	Quality	AS	TAS	AS	TAS	AS	TAS
1	0.18125	2.875	0.521094	2.875	0.521094	2.75	0.498438
2	0.1125	2.625	0.295313	2.125	0.239063	3.25	0.365625
3	0.13125	2.5	0.328125	2.75	0.360938	3.875	0.508594
4	0.1375	3	0.4125	2.625	0.360938	3.625	0.498438
5	0.1125	2.625	0.295313	3.25	0.365625	2.75	0.309375
Weakness							
1	0.085	3.375	0.286875	1.625	0.138125	2.625	0.223125
2	0.075	2.875	0.215625	2	0.15	2.125	0.159375
3	0.06875	2.75	0.189063	2.125	0.146094	3.375	0.232031
4	0.05625	2.125	0.119531	2.125	0.119531	2.875	0.161719
5	0.04	2.375	0.095	2.25	0.09	3.5	0.14
Oppty							
1	0.1	2.875	0.2875	2.875	0.2875	2.375	0.2375
2	0.15625	2.625	0.410156	3.125	0.488281	3	0.46875
3	0.13125	2.25	0.295313	2.625	0.344531	2	0.2625
4	0.085	2.125	0.180625	3.375	0.286875	2.625	0.223125
5	0.1275	2.5	0.31875	2.625	0.334688	3.5	0.44625

Strength	Strategy 1		Strategy 2		Strategy 3		
Threats							
1	0.06875	2.125	0.146094	3.375	0.232031	1.625	0.111719
2	0.09375	2.5	0.234375	3.125	0.292969	3.625	0.339844
3	0.075	2.5	0.1875	2.125	0.159375	3.625	0.271875
4	0.0875	2.5	0.21875	3.125	0.273438	3.125	0.273438
5	0.075	2	0.15	1.875	0.140625	2.875	0.215625
Total	5.1875		5.331719		5.947344		
Ranking	3		2		1		

5. CONCLUSIONS

From the results of the analysis and discussion, it can be concluded that PT. ABP's position based on the IE matrix is in Quadrant 5, i.e., Grow and build. This means that the strategy pursued through the potential evaluation as a market leader can be achieved through Intensive strategies, such as market penetration, market development, or integrative approaches involving vertical and horizontal integration. The company can focus on the top three alternatives by utilizing sensor technology (RFID) to accurately and automatically track each moving package or cargo, as the issues of cargo packing and overcarried goods are also priority concerns for the company. Therefore, the implementation of advanced technology for real-time tracking can reduce errors and enhance the effectiveness and efficiency of employees and the company's overall performance.

Suggestions for further research to evaluate the marketing strategy mix should be conducted in a more detailed and open manner, covering a broader upstream-downstream supply chain sector, so that various aspects of the company can be seen more clearly. Additionally,

Competitor factors can be presented more clearly with accompanying weighting and competitive advantages.

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