

# A Conceptual Framework of Strategy Formulation for Aircraft MRO

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## ABSTRACT

MRO industry has entered a new era marked by increasingly competitive competition and COVID-19 impact. MRO has several lines of business which needs a strategy that can restore the company's performance to survive, recover, and grow. This study was conducted with the objective of selecting potential strategy by identifying internal and external factors from airframe business and formulating strategy using David's model which includes input, matching, and decision stage. AHP was used to determine weight of internal and external factors based on the results of IFE, EFE, and CPM Matrix in the input stage. SWOT, IE, BCG, and SPACE Matrix in matching stages generated some strategic alternatives. Furthermore, at the decision stage, QSP Matrix was used to determine an alternative strategy. A new business model will be applied using New Business Model Canvas. The expected result is to recommend the potential strategy in the business airframe sector.

**Keywords:** Strategic Formulation, David's Model, MRO, Airframe.

## 1. INTRODUCTION

The Development of a country is influenced by its transportation routes, especially its air transportation. The air transportation will connect the cities and countries just in a short time. To ensure the availability of the good condition of the airline, it needs to be supported by excellent fleet maintenance (Shaukat et al., 2020) [1].

One of the ways to achieve prime service quality and security is by carrying out routine maintenance, repairing and inspecting the processes. This process can be done by MRO (Maintenance, Repair, Overhaul) company. Company X is an aircraft maintenance services company in Indonesia. The core business of company X is providing aircraft maintenance and repair services which include aircraft frames, engines, components and other supporting services.

The competition in the MRO industry in Asia requires company X to have a dynamic business environment. To face these challenges, the company should be more innovative, improving the performance and implementing the right strategy. An airline needs a reliable aircraft maintenance service to support its operational activities (Mirković et al., 2016) [2]. Thus, every MRO company competes to provide the best service and get a potential market in order to share to win the competition.

2020 is a very tough year for the aviation industry because the world is facing COVID-19 pandemic. Several countries have implemented policies to impose lockdowns to prevent the spread of COVID-19. In Indonesia, the government implemented a Large-Scale Social Restriction (PSBB) policy. The purpose is to reduce the spread of the virus. Lockdowns or restrictions in several countries also directly have an impact on aviation activities (Amankwah-Amoah, 2020) [3]. Figure 1 shows the business sector is affected by COVID-19 from low to high levels. Aviation industry is at the high levels, which means COVID-19 has caused a big impact on the industry. However, in these conditions, it is possible for the MRO industry to have an opportunity to survive and shine again (Dinis et al., 2019) [4].

As a company that services on Maintenance, Repair, Overhaul (MRO), the volatile demand of the aviation industry has a major effect on the performance of company X. The atmosphere of the air traffic is quiet, resulting in an aircraft that should have been due for maintenance but have delayed their entry because the aircraft did not fly. Moreover, the airline's financial condition also affects the ability to make maintenance payments. This condition has a direct impact on the company's financial condition. Table 1 shows that the income decreased by 35 percent from the previous year with the achievement in the same period.

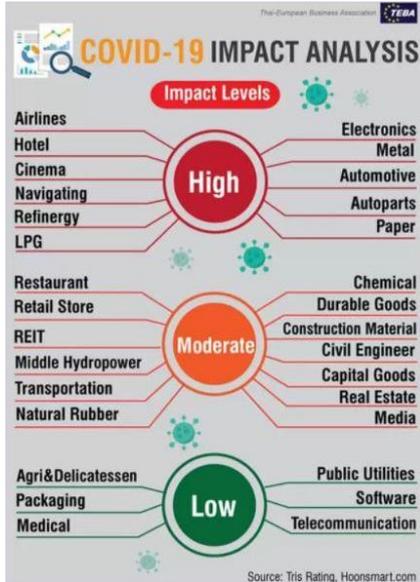


Figure 1. COVID-19 Impact Analysis (Tris Rating, 2020)

With the current condition of company X, there are many things that become the objects for innovating and formulating strategies in order to bring back its business. The airframe business is one of the business lines that have the potential to be developed because it has labor-intensive resources. Furthermore, the airframe business line is also one of the revenue generators for the company. According to the Oliver Wyman report, from the external side, it sees an opportunity based on the annual growth rate or Compound Annual Growth Rate (CAGR) of the airframe business in the next four years up to 5.5 percent.

Table 1. Revenue Achievement



Source: Company X (2020)

In this case, the strategy formulation method is needed which can be used to assist the company in formulating strategies for the airframe business line. The strategy formulation was using David's Model (2017) [5], a comprehensive, integrated, implemented, and cross-functional model that enables organizations to achieve their goals. According to David & David (2017) [5], there are three stages in formulating a strategy, which are the input stage, matching stage & decision stage. This study on strategic management and strategy

formulation of airframe business in the MRO industry is expected to help companies choose a reliable strategy to survive, recover, and grow in the next period

## 2. LITERATURE REVIEW

### 2.1 Definition and Overview of MRO Industry

The MRO (Maintenance, Repair, Overhaul) is included in the aircraft maintenance industry and has been known since the aircraft maintenance and repair business. The term MRO does not merely describe the products or services produced by aircraft maintenance organizations, but has evolved to describe the industry itself. In practice, the MRO industry focuses on the maintenance and repair of aircraft, engines, components, and airframes. Meanwhile, the aviation industry focuses on aircraft operations and air transport services. However, the MRO industry remains an integral part of the aviation industry. The MRO industry is a capital coal industry with the purpose to order the model with similar characteristics to the motor vehicle repair industry, shipyard MRO, etc. The influence factors will be explained in more details.

### 2.2 Airframe Business

Airframe Maintenance give a service such as routine heavy checks, modifications, aircraft painting & furnishing, cabin refurbishment, major structure repairs, and overhaul. Types of aircraft that have a certification from EASA, FAA, DGCA and aviation authorities of other countries. Its capabilities are B737-CL, B737-NG, B737-MAX, A320, A320NEO, ATR72, and CRJ1000. Airframe Maintenance have on a large hangar which can accommodate about 15 small aircrafts simultaneously, one special line for aircraft painting, and a structure workshop.

### 2.3 Internal and External Environmental Aspects

Internal and external environment is to determine its potential strengths and weaknesses. In addition, it can develop opportunities that provide benefits and avoid threats. Internal and external environmental aspects were obtained from several literature studies and secondary data owned by the company. These aspects were determined before so that there is no misinterpretation in determining factors, especially external factors.

### 2.4 Strategic Management

According to David & David (2017) [5], the definition of strategic management is the art and knowledge of formulating, implementing, and

evaluating cross-functional decisions that enable an organization to achieve its goals. According to Pearson and Robinson (2000) [6], strategic management is defined as a set of decisions and actions resulting in the formulation and implementation of plans designed to achieve company goals. Meanwhile, Jauch & Gleuck (1998) [7] states that strategic management is the flow of decisions and actions which lead to the development of effective strategies in order to achieve company goals.

## 2.5 Strategic Management Models

The first of the four models covers the formulation strategy at the corporate level, while the others are only at the business level. Among the models of corporate level strategy formulation, David's model is considered as the most systematic and comprehensive one. This model is the only strategy formulation model that uses quantitative methods, and the formulation process uses nine methods with 14 alternative types of strategies that can be generated (Ma'ruf et al., 2004) [8]. Table 2 shows several strategic management models that can be used by companies.

**Table 2.** Description of Strategic Management Models

Model	Tingkat	Deskripsi Model	Keterangan
David, 2003	Corporate & Business Levels	Menggunakan 9 metode formulasi strategi, yang terintegrasi dalam 3 tahapan formulasi dengan 14 alternatif strategi yang dapat dipilih.	Formulasi strategi pada tingkat korporat dan bisnis, strategi dipilih sesuai TAS (kuantitatif).
Thompson-Strickland, 2001	Corporate Level	Menggunakan suatu model yang dikenal dengan "The Five Tasks of Strategic management."	Model analisisnya sangat kualitatif.
Pearce-Robinson, 2000	Corporate & Business Levels	Menggunakan "the Porter Generic Strategies," dengan 15 alternatif strategi yang dapat dipilih.	Model formulasi strategi pada tingkat korporat dan bisnis menjadi satu (kualitatif).
Weelen-Hunger, 1994	Corporate Level	Menggunakan 6 metode formulasi strategi dan 9 alternatif strategi.	Pemilihan strateginya hanya bersumber dari hasil analisis SWOT, dan bersifat kualitatif.
Mintzberg, 1998	Business Level	Menggunakan suatu model dasar yang dikenal dengan "Basic Design School Model."	Model yg mempertimbangkan social responsibility & managerial values.
Treacy & Wiersema, 1997	Business Level	Menggunakan suatu model dasar yang terdiri dari tiga dimensi (product leadership, customer intimacy, operational excellence).	Setiap dimensi memiliki Core Processes yang terdiri dari 4 komponen (organization, management system, culture, information technology).
Porter, 1985	Business Level	Menggunakan model dasar yang dikenal dengan "Generic Competitive Strategies," (focus, cost leadership, differentiation).	Model yang cocok dan banyak digunakan untuk formulasi strategi pada business level (kualitatif).

Source: Ma'ruf et al. (2004) [8]

## 2.6 David's Model Strategy Formulation

According to David & David (2017) [5], there are three stages for strategy formulation framework such as: input stage, matching stage and decision stage.

### 2.6.1 Input Stage

This stage requires a strategist to measure subjectivity during the early stages of the strategy formulation process. Conducting small decisions in the matrix about the relative importance of external and internal factors allows strategists to more effectively generate, prioritize, evaluate, and choose the alternative

strategies. At the input stage, there are three matrices, which are IFE Matrix, EFE Matrix, and Competitive Profile Matrix (CPM). IFE Matrix is a matrix that displays the internal factors and affects a company in running its business. EFE Matrix is a matrix that displays external factors and influences a company in running its business. CPM is an important strategic management tool for identifying the strengths and weaknesses of a company with its main competitors.

### 2.6.2 Matching Stage

In matching stage consists of four techniques that can be used: BCG Matrix, IE Matrix, SWOT Matrix and SPACE Matrix. SWOT matrix is a tool that can be used to develop four strategic options: the SO (Strengths-Opportunities) strategy is a strategy uses by a company in optimizing its strengths to take advantage of the various opportunities available; the WO (Weakness-Opportunities) strategy is a strategy used by companies to cover as much as possible the existing shortcomings by taking advantage of opportunities from external factors; the ST (Strengths-Threats) strategy is a strategy used by the company to utilize the optimal strength to deal with threats from outside factors; and the WT (Weakness-Threats) strategy is a strategy to minimize company weaknesses and avoid existing threats. The BCG (Boston Consulting Group) matrix shows the industry's position in a business portfolio using the industry's growth and relative market share position for the industry. The relative market share position is defined by ratio of an industry's market share (sales) to relative market growth. IE Matrix Analysis is used to determine a company's current position and comprehending the internal conditions as well as the strategies which have the potential to the existing external conditions. The Strategic Positioning and Action Evaluation (SPACE) matrix is one of the matrices used by a company to determine the most suitable strategy to be implemented. All analytical tools in the matching stage depend on information obtained from the input stage to match internal strengths and weaknesses with external opportunities and threats. Adjusting the key internal and external factors is very important to produce viable alternative strategies effectively.

### 2.6.3 Decision Stage

One way to choose an alternative strategy is to use the Quantitative Strategic Planning Matrix (QSPM), a suitable analytical tools to objectively implement alternative strategies based on internal and external factors that have been previously identified and are relatively feasible. To determine the relative attractiveness of the strategies that have been developed

at the matching stage, the tools used is the Quantitative Strategic Planning Matrix (QSPM). This matrix shows the best alternative based on the information obtained from the input and matching stages. External and internal factors from the previous analysis are used to evaluate the attractiveness of each strategy.

### 3. RESEARCH METHODOLOGY

The formulation of the concepts and methods of this study is shown in the flowchart in Figure 2. The study started with literature study, field study, data collection, data processing, analysis of results and discussion, and finally, conclusions and suggestions.

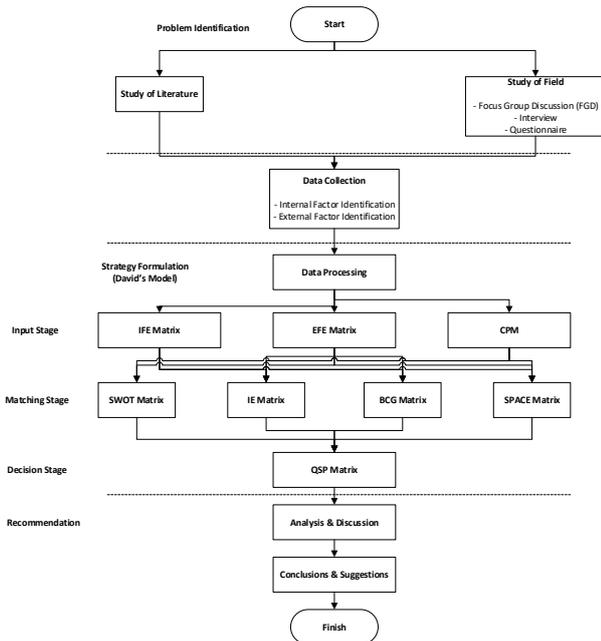


Figure 2. Research Framework

Literature studies were carried out by reading books, journals, several companies websites, and information on the internet related to the topic. Literature studies were also used as a theoretical basis for research. The use of field studies aimed to determine the actual conditions regarding the characteristics of the airframe business of the MRO company as well as the problems raised as a research. The data used in this study are primary data and secondary data. The primary data used are questionnaires, focus group discussions (FGD), and interviews.

Zikmund & Babin (2016) [9], a questionnaire is a technique of collecting data or information by giving a set of questions or written statements to respondents in order to answer them. The questionnaire in this study aimed to determine the influence and importance of internal and external factors, to obtain a rating of internal and external factors on the airframe business line. FGD is a process of collecting data and

information systematically on a specific problem through group discussions (Huntink et al., 2014) [10]. FGD in this study was conducted to assist in the preparation of the SWOT Analysis at the matching stage and QSPM at the decision stage. An interview is questions and answers between two parties which consists of interviewers and sources in order to obtain the data, information, or opinions about something (Hamilton & Finley, 2019) [11]. Interviews were conducted to obtain information from the experts in their fields in providing value to the company and the aspects of SPACE Matrix.

### 4. ANALYSIS & DISCUSSION

It is important to identify internal and external factors prior to the input stage. These factors were obtained from literature studies and company input. According to the Harvard Business Review (1991), internal factors are divided into two, tangible resources and intangible resources. For example, product quality produces reliable service products which are so important for the MRO, Rodrigues & Lavorato (2016) [12]. Cash flow & working capital become the important thing to running the business to maintain and handle the projects (Barry et al., 1996) [13]. For external factors, it is also divided into two, industrial environment and national environment. For example, supplier in a strong position as market leader (Alamanda et al., 2019) [14]. The unpredictable conditions from external factors will be affected by the MRO industry (Ghorbani et al., 2015) [15], as we know we are facing a pandemic for almost one year. Either from internal factors or external factors, there are supporting sub-factors. In this study, there are 13 internal factors to determine the potential strengths and weaknesses of the company. Meanwhile, there are 11 external factors that can provide benefits by developing opportunities and avoiding threats.

In the input stage, there were three matrices used, namely IFE Matrix, EFE Matrix and Competitive Profile Matrix (CPM). Internal and external factors were identified through literature studies and Focus Group Discussion (FGD). The weight of each factor was determined by the Analytical Hierarchy Process (AHP) and the rating for each factor was obtained from questionnaires that were distributed to several respondents. The IFE matrix was utilized to evaluate the internal factors of a company, which specifically was an MRO company in this study. These internal factors include strengths, which are positive factors, and weaknesses, which are negative factors. The factors were obtained from literature studies and company input, and the results of the weight and value were based on the questionnaires distributed to the respondents. A

multiplication was made between the weight value and the rating value. The same step was done to the EFE Matrix with external factors including opportunities, which are positive factors, and threats, which are negative factors. Meanwhile the CPM shows a clear picture of the strong points and weak points of the company relative to competitors. CPM ratings were measured based on critical success factors, where each factor was measured on the same scale for each company, but varying ratings made it easier to carry out a comparative analysis.

The matching stage used four matrices as analysis tools, namely BCG Matrix, IE Matrix, SWOT Matrix and SPACE Matrix. The SWOT Matrix analyzed the external environment and the internal environment together to obtain a systematic approach and support for decision making (Kurttila et al. 2000) [16]. SWOT developed four types of strategies, SO (Strength-Opportunity) Strategy, WO (Weakness-Opportunity), ST (Strength-Threat), WT (Weakness-Threat) Strategy. The key to the success of the SWOT matrix is to bring together internal and external factors to form a strategy. This matrix is based on logic that maximizes strengths and opportunities, but simultaneously minimizes weaknesses and threats. IE Matrix positions the various divisions of an organization in a nine-cell view. IE Matrix is based on the total weighted value obtained on the IFE and EFE score, which are total IFE score on the X axis and the total EFE score on the Y axis. BCG Matrix was used to determine the position and potential of existing business lines in the company, especially those that become revenue generators for the company. The percentage of revenue and profit were obtained from company data. Meanwhile, the estimated relative market share was obtained from the company's market share divided by the competitors' market share. Then for market growth, it was obtained from several literature or aviation reports. BCG analysis can be seen through four quadrants, Question Mark, Stars, Cash Cow and Dogs. There are four analysis quadrants in the SPACE Matrix, Aggressive, Conservative, Defensive and Competitive. The internal dimension consists of financial strength (Financial Position-FP) and competitive advantage (Competitive Position-CP) while the external dimension consists of environmental stability (Stability Position-SP) and industrial strength (Industrial Position-IP). Each matrix produces the output of the strategies from the input stage. With four matrices, each type of strategy will be identified and after that it will show their suitability which is the output of each of these matrices.

The next step is the decision stage, which is the stage in determining the strategy that has been developed at the Matching Stage. This stage used the Quantitative Strategic Planning Matrix (QSPM) tools. The QSPM is a tool that enables strategists to evaluate

various alternative strategies objectively, based on the identified internal and external critical success factors. QSPM also requires a good intuitive judgment from the expert judgment in the FGD. The goals of QSPM are to determine the relative attractiveness (relative attractiveness) of the various alternatives that exist and determine the strategy that is considered the best to be implemented. There are three Grand Strategies that are compared at QSPM and the best is selected.

Based on the formulation of strategies using David's model (2017) [5] and the QSPM method, a selected strategy will be obtained and adjusted to current conditions based on the compatibility with the company situation. The expected results of this study are in the form of potential strategic implications that have a positive impact on the company with predefined inputs in a hope that the chosen strategy is the most potential strategy for the company. The chosen strategy was expected to become a recommendation for the airframe business, which later can be reduced to several strategic initiatives that are carried out. After that, an update was made to the New Business Model Canvas. The concept of BMC can describe and manipulate business models in order to generate new policy alternatives. BMC was displayed on a canvas consisting of nine elements, which are revenue streams, customer relationships, customer segments, key activities, key partners key resources, value propositions, cost structure, and channels. Therefore, the addition of business models to the airframe business line after the strategy selection can be made.

## 5. CONCLUSION

This study examined the formulating strategy for MRO aircraft. It can be concluded that the chosen strategy is the most potential recommendation for the company. David's models for strategy formulation could be used to develop and formulate the business level strategy of X Company. Based on the results of QSPM, there are three Grand Strategies developed. The most suitable Grand Strategy with the highest score of TAS has been chosen. Then, the potential recommendations hopes to help the company survive, recover & grow in line with the company's goals.

The identification of the strategic internal and external factors in David's model could be enhanced further by applying other statistical methods like Factor Analysis. For the company, David's model of strategy formulation could become an alternative in formulating strategy in the MRO industry despite its limited application in the fields, while for academia, more research on the application of David's model in the MRO company should be promoted to see how effective the model works in the industry.

## AUTHORS' CONTRIBUTIONS

The author wants to provide a variety of research and insights to the world of aviation, especially the MRO industry. Moreover, the use of David's Model in strategy formulation in MROs is still uncommon.

## ACKNOWLEDGMENTS

This study was conducted to determine the concept of a strategy formulation framework using the David Model. This strategy can generally be used in various types of industries, including MRO industry. Analysis of internal and external factors is the key in determining the input stage. These factors can be obtained based on literature studies or company input. For this reason, the authors would like to thank Company X for providing the opportunity to do this research well.

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