



Distribution Process of Biodiesel as a Primary Fuel to Support the Implementation of Logistics Strategy in Central Java

Yunanik^(✉) and Sono

Logistics of Oil and Gas Department, Energy and Mineral Polytechnic (PEM AKAMIGAS)
Cepu, Cepu, Indonesia
yunanikyuna63@gmail.com

Abstract. This study focuses on the distribution process of Biodiesel in relation to the logistics strategy of the FUEL TERMINAL which regulates the supply of Biodiesel products to Consumers (SPBU) as primary fuel. The analysis method used is SWOT, IFE, EFE and Internal External Matrix (IE). The results of the SWOT analysis from Fuel Terminal shows that the strategic direction is at coordinate points (2,09; 1,95) and from gas stations (0,39 ; 0,44). Whereas, there is a differences between the Fuel Terminal and at the Gas Station (1,7; 1,51), it can be seen that the position is between the opportunity and strength axes. The two analyzes produce growth strategy priorities in Quadrant I– (SO). In this case, Biodiesel product companies in Central Java Province are advised to develop Biodiesel products by opening geographic markets such as regional expansion, national and international, market penetration by strengthening effective and efficient promotions according to market targets and future integration by increasing convenience for customers and diversification concentrically by creating synergies with existing Biodiesel products.

Keywords: Strategy, distribution, SWOT, IFE, EFE

1 Introduction

Biodiesel energy is important for human life processes, heating, cooling rooms, lighting equipment, transportation equipment, communication equipment, office equipment, and even factories, up to medical equipment in hospitals. The use of biodiesel, known as B20, which has been launched since 2016 has proven to be able to reduce imports of fossil fuels and during 2018-2019 was able to reduce imports of diesel from 15.3 million barrels in 2018 to 0.8 million barrels in 2019, save foreign exchange of USD 1.89. [2].

Central Java consists of 29 regencies and 6 cities with an area of 32,800.69 km², the population density based on the Central Bureau of Statistics in 2021 is 34,718,204 people with a density of 1,058.46 people/km². (KL). [1] The realization of the distribution of subsidies for the type of Biodiesel in Central Java Province amounted to 1,930,598 Kiloliters [3].

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Oil Fuel Terminal is the location of supply points for fuel delivery points for customers. The Biodiesel Fuel Terminal, which is known as the Fuel Terminal is to manages supplies at gas stations, distribution from the Fuel Terminal to gas stations is very important to plan and carry out properly [3].

Problems that usually occur in the Biodiesel product distribution process are inaccuracies in the time and amount of Biodiesel product shipments to the designated gas station. At the time of delivery, there were two problem conditions, namely delays due to irregularities that occurred on the road to the gas station and distribution scheduling planning made by the Fuel Terminal and arrival time that was too fast resulting in an excess amount of Biodiesel in the gas station storage tank. This condition results in inefficiency in the planning that has been made by the Fuel Terminal.

Based on the above mentioned, the researcher wants to know the process of distribution flow of Biodiesel in relation to the logistics strategy in the context of Biodiesel distribution including, modes of transportation (tank trucks), costs and the dynamics of the political economy and technology that accompanies it [2]. Basically what is meant by the fuel supply system here is the fuel oil distribution system from the oil refinery and fuel oil imports to the Fuel Terminal/TBBM, while what is meant by the fuel oil distribution system is the fuel oil distribution system from the depot to consumer. The types of facilities and their operation are adjusted to the situation and conditions of the area where the type of operation is in the form of a Fleet or Tank Car [1].

For this purpose, it is necessary to study environmental aspects both from the internal and external environment which influence the pattern of institutional/institutional strategies in achieving goals with SWOT Analysis, IFE, EFE, and Internal External (IE) Matrix and Trend analysis [4].

Below are the facilities of the New Gantry System (NGS) at the Semarang Pengapon Group Oil Fuel Terminal (TBBM) to manage supplies at gas stations. Distribution from the Fuel Terminal to gas stations is very important to plan and carry out properly, and gas stations are places to refuel land vehicles. Standard facilities and infrastructure that must be owned by each SPBU for distribution of biosolar, in the Fig. 1.



Fig. 1. (1) (2) The new gantry system (NGS) facility at the Semarang Fuel Oil Terminal (TBBM), and (3) example of a Gas Station in Demak, Category: Pertamina gas stations (Pasti Pas) (Source: Integrated Terminal Pengapon, 2021)

There were several previous studies related to research that the authors obtained from the research journal Pasquale Carotenuto; Stefano Giordani; Simone Massari; Fabrizio Faggagini (2015), [5] entitled Periodic Capacitated Vehicle Routing for Retail Distribution of Fuel Oils with the results of his research namely Minimizing daily fuel

distribution costs to oil and gas companies [3], and journals from Eko Ananda Permadi, Thomson Sebayang, and Diana Chalil Analysis of Biodiesel Distribution in Medan City with the results of his research regarding the development of the number of gas stations and the volume of biodiesel distributed [4].

The two studies, it does not appear to be more specific regarding the distribution process of Biodiesel with the implementation of a logistics strategy.

2 Method

The analytical method that can be used in research, is SWOT (Strengths, Weaknesses, Opportunities, Threats), with the aim of producing an appropriate recommendation to be implemented in Central Java. In the SWOT method, some factors decide to be stronger. SWOT analysis is carried out in a matrix, which clearly describes how the external opportunities and threats faced by project or business activities can be adjusted to the strengths and weaknesses they have.

The qualitative SWOT data above can be developed quantitatively by calculating the SWOT Analysis developed so that the actual position of the organization is known certainty. The calculations were carried out through three stages [5]. The method used is to analyze the company's internal (strengths and weaknesses) and external (opportunities and threats) environment which is the basis for conducting a SWOT analysis [6]. SWOT analysis is carried out through the IFE (Internal Factor Evaluation) matrix which will describe the company's biggest strengths and weaknesses factors and the EFE (External Factor Evaluation) matrix which will describe the opportunity and threat factors owned by the company and the IE (Internal External) matrix which shows the current position of the company. The Internal Factor Evaluation (IFE) data is a SWOT analysis of the distribution process from the FUEL TERMINAL to this gas station, to maximize strengths and seize existing opportunities so that they can successfully compete in the Biodiesel product business and External Factor Evaluation (EFE) Analysis. External Factors at the Fuel Terminal. This Opportunities (O) and Threats (T)/OT strategy is carried out to analyze external factors, this OT strategy is carried out to analyze external factors.

2.1 Distribution

Based on the data obtained during the research, in the implementation of the distribution of certain types of fuels conducted by commercial entities in 2019, according to No. SK: 55/P3JBT/BPH Migas/Kom/2019 dated December 11, 2019 [6]. The function of distribution is to continue the ordering process that was previously handled by Sales Service (SS) by conducting H+1 Fuel Distribution Planning. The conditions for distribution are the presence of a fleet (AMT, AMT partner, tanker) and LO number [7]. Before entering the logistics strategy, the fuel distribution flow from the Fuel Terminal to the customer (SPBU) will be explained as follows:

1. The tank car is parked, then AMT and its partners do fit to work at the PT Patra Niaga office. If AMT and its partner are declared healthy, immediately print the finger on AFM which states they are ready in the system.
2. The dispatcher will look at the SIOD. If the tanker is ready, LO is ready, and AMT and its partner are ready, a trip number segment will be scheduled and if it does not get a trip number segment, the fleet cannot enter the NGS area.
3. After obtaining the trip number segment, AMT will receive a loading instruction from PT Patra Niaga which contains its own use or the type of fuel that the tanker will use and what oil to carry. The tanker will enter Fuel Terminal (SBPU) to refuel the tanker itself. Then it will queue at the gate in NGS and will receive another loading instruction. The LO number is updated, so there will be a seal number. The seal is used to ensure, for example, that the capacity is 5000 KL to a gas station that is also 5000 KL.
4. Tank cars queue to enter the Bay to fill until the process is complete.
5. The tank car goes to the gate out and will get a travel permit.
6. Finally, go to the seal shelter for seal installation and tank cars ready to distribute.

Location and Time of Research The research was carried out at a Public Fuel Filling Station (SPBU) in the province of Central Java. Preliminary research is the process of acquiring knowledge about basic information about Fuel Terminals/TBBM in Central Java. This process was carried out by collecting initial data through interviews at Pertamina MOR IV Semarang and the Office of the Ministry of Energy and Mineral Resources, Central Java province.

3 Result and Discussion

The sampling technique in this study was adjusted to the required sample size depending on the source, available time, and research objectives [8]. Data collection was carried out by distributing questionnaires and the sample size was determined by taking 50% of the number of gas stations that distribute Biodiesel. Thus, from the 84 gas stations that distribute Biodiesel, 40 gas stations were taken as a sample, while the sample distribution was The 4 parts of Central Java Province were carried out proportionally cluster sampling by classifying the sample proportionally based on the interviewees and deliberately selected based on the audience, in this case, the Gas Station (SPBU) and Stakeholders related to policymakers, Researchers utilize inputs /responses and directions both from leaders/position holders related to the research theme, and Supervisors/Supervisors, officers who work at gas stations in the province of Central Java. After obtaining the results of the assessment from Supervisors and officers working at gas stations, then the score obtained is counted by using a Likert scale with 5 choices that will be chosen by respondents, from the 5 gradations of these answers, will then be processed as a determinant of the results of this research analysis,[8] by selecting answers regarding a policy/phenomenon that is happening, according to the Table 1.

Table 1. Likert Scale

Score	Description
1	Strongly Disagree
2	Disagree
3	Neutral
4	Agree
5	Strongly Agree

3.1 Analysis and strategy in the distribution process is a SWOT analysis

A business process is a collection of regular work processes to distribute a product and service that provides benefits or added value to its users [9]. Business processes are formed and managed to meet consumer needs. The main factors in business processes are effectiveness, efficiency, and adaptability. Business processes must be formulated, planned and designed in a systematic and structured manner so that they are easy to implement, track and repair, with SWOT Analysis, IFE, EFE and Internal External (IE) Matrix. In the SWOT method some factors make a decision to be stronger.

Such as Strengths, Weaknesses, Opportunities and Threats that may occur in achieving a goal of project or business activities, institutions or institutions on a wider scale [10]. That's why the SWOT method was chosen [11]. SWOT analysis is carried out in a matrix, which clearly describes how the external opportunities and threats faced by project or business activities can be adjusted to the strengths and weaknesses they have. This SWOT matrix is the four possible strategic alternatives, namely SO, WO, ST and WT. The S and W strategies are internal factors or factors within an organization, while the OT Strategy is carried out to analyze external factors [12].

SWOT analysis on the distribution process from FUEL TERMINAL to gas station to maximize strengths and seize existing opportunities so that they can successfully compete in the Biodiesel I product business. Theresearch results will be presented through the distribution of questionnaires and interviews to people who are deliberately selected for internal factors or Strategy Strengths (S) and Weakness (W), and External Factors are Opportunities (O) and Threats (T). This OT strategy is carried out to analyze external factors, through questions that have been selected and analyzed and results obtained for Internal factors (IFE) at Fuel Terminals and Gas Stations in Central Java, according to the strengths and weaknesses, opportunities, and threats they have.

3.2 Internal Factors (IFE) – Fuel Terminals

Strength is obtained internally related to Biodiesel/Subsidy products, distribution of products/services, experience and dominance, information technology and price. Internal Factors or Strength (S) and Weakness (W) Strategies. By assessing internal strategic factors such as strengths and weaknesses and assessing external factors opportunities and threats by means of: $\text{Weight} \times \text{Rating} = \text{Total Score}$. It can be explained the direction of the strategy: the total score of strengths: 2,16, the total score of weaknesses: -

2,02, the value of the Internal evaluation matrix is obtained from the total Strengths – total Weaknesses = 4,17 (X axis).

3.3 External Factors at the Fuel Terminal

Opportunities (O) and Threats (T)/OT strategies are carried out to analyze external factors. This OT strategy is carried out to analyze external factors. The direction of the strategy can be explained: total opportunity score: 2,02, total threat score: -1,89, so that the value of the External Evaluation matrix is obtained from the total opportunities – total threats = 3,91 (y axis). Furthermore, to determine the coordinates of the internal analysis obtained from the total score of strengths - total score of weaknesses)/2 = 2,16 - (-2,02)/2 = 2,09, while to determine the coordinates of the External analysis obtained from the total score of opportunities - total score threat)/2 = 2,02- (-1,89)/2 = 1,95. The calculation results for each quadrant can be described in Table 2.

Table 2. Analysis of Fuel Terminal Point Matrix

Quadrant	Point Matrix	Matrix Area	Ranking	Strategy Priority
I	(2,16 ; 2,02)	4,36	1	Growth
II	(-2,02 ; 2,02)	-4,08	3	Stability
III	(-2,02 ; -1,89)	3,82	2	Combination
IV	(2,16 ; 1,89)	-4,08	3	Stability

This matrix can generate four possible sets of strategic alternatives as shown in Fig. 2.

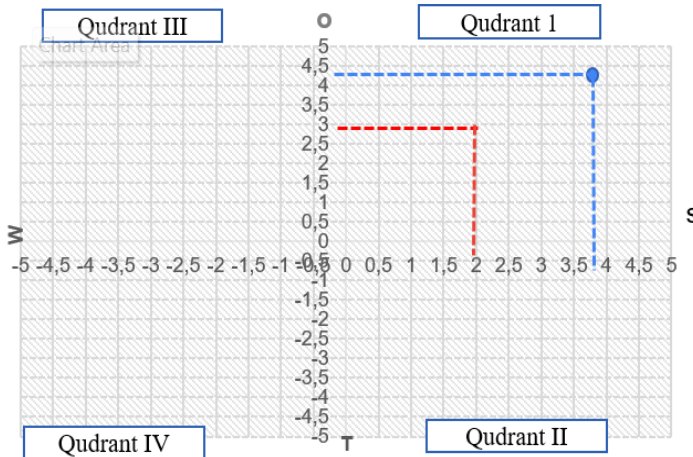


Fig. 2. SWOT Analysis Diagram

Based on the results of the analysis and Figure 4, it can be explained that the strategic direction is at coordinate points (2,09 : 1,95) so that it can be seen that the position between the opportunity and strength axes is in quadrant I (strong competition) meaning the development of passers by opening up geographic markets such as regional expansion, national and international, market penetration by strengthening effective

and efficient promotions according to the target market, developing Biodiesel products, future integration by increasing convenience for customers and concentric diversification by creating synergies with Biodiesel products and existing products. In this case, Biodiesel product companies in Central Java are advised to carry out a progressive strategy by utilizing the company's internal strengths to take advantage of external opportunities in achieving increased business growth.

3.4 Internal Factors (IFE) – Gas Station Consumers

Strength is obtained internally related to Biodiesel/Subsidy products, distribution of products/services, experience and dominance, information technology and price. Internal Factors or Strength (S) and Weakness (W) Strategies [13]. By assessing internal strategic factors such as strengths and weaknesses and assessing external factors opportunities and threats by means of: $\text{Weight} \times \text{Rating} = \text{Total Score}$ [14]. It can be explained the direction of the strategy: the total score of strengths: 0,42, the total score of weaknesses: -0,35, the value of the Internal evaluation matrix is $0,42 - (-0,35) = 0,77$ (X axis), and External Evaluation Matrix is $0,415 - 0,37 = 0,79$ (Y axis)

3.5 External Factors at Gas Stations

This Opportunities (O) and Threats (T)/OT strategy is carried out to analyze external factors, this OT strategy is carried out to analyze external factors. The direction of the strategy can be explained: total opportunity score: 0,415, total threat score: -0,37, so the value of the External Evaluation matrix is $0,415 - (-0,37) = 0,79$ (y axis). In addition, to determine the coordinates of the internal analysis obtained from the total score of strengths - total score of weaknesses)/2 = $0,42 - (-0,35)/2 = 0,39$, while to determine the coordinates of the external analysis obtained from the total score of opportunities - score total threat)/2 = $0,415 - (-0,37)/2 = 0,44$ (Y axis). The calculation results for each quadrant can be described in Table 3.

Table 3. Analysis of Point Matrix at gas stations

Quadrant	Point Matrix	Matrix Priority	Rank	Strategy Priority
I	(0,42 ; 0,415)	0,17	1	Growth
II	(-0,35 ; 0,415)	-0,15	3	Stability
III	(-0,35 ; -0,47)	0,16	2	Combination
IV	(0,42 ; -0,47)	-0,20	4	Shrinking

This matrix can produce four possible sets of strategic alternatives and it is found that the value of $X = 0,39$ and the value of $Y = 0,44$ as shown in Fig. 3.

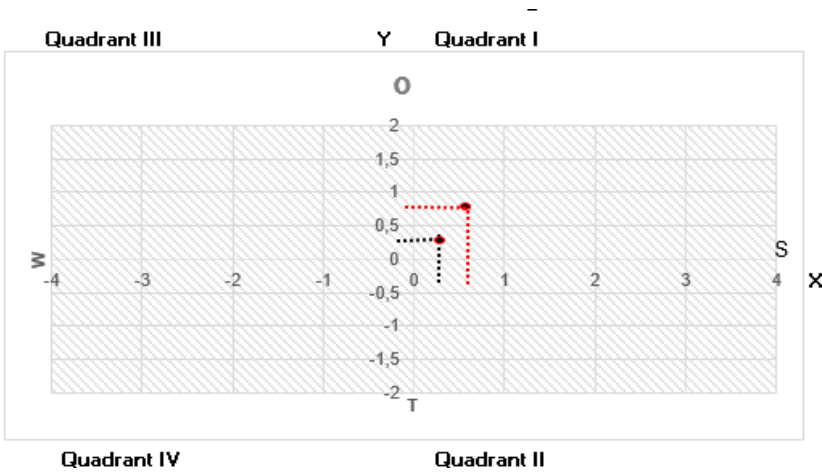


Fig. 3. SWOT Analysis Diagram

From the analyses of internal Factor (IFE) Gas Station Consumers dan External Factors (EFE) at Gas Stations, it is clear that both of them produce growth strategy priorities and are in a position in quadrant I. And the only difference is in ranking for strategic priority fuel terminals in Quadrant I – (SO) Growth factor value of 4,36, Quadrant II – (WO) and Quadrant IV- (ST) priority strategy value stability factor – 4,08 ; - 0,48, and Quadrant III - (WT) combination strategy priority with a factor value of 3,82, while SWOT analysis based on SPPU respondents and ranked results in Quadrant I - (SO) priority Growth strategy factor value of 0,42 ; 0,415, Quadrant II – (WO) priority stability strategy factor of – 0,35 ; 0,415, Quadrant III – (WT) strategy priority and Quadrant IV- (ST) shrinking strategy priority with a factor value of 0,42 ; 0,47. In this case, Biodiesel product companies in Central Java Province are advised to carry out a progressive strategy by utilizing the company's internal strengths to take advantage of external opportunities in achieving increased business growth. This is in line with the government's mission which is implementing a mandatory 20% biodiesel program or known as B20 which has now been upgraded to B30 as of January 1 2020. And from the side of government assignments for the provision and service of Subsidized Fuel (Biodiesel B30) according to the mandatory program already running well, it needs improvement from what has been achieved at this time [15].

3.6 Results Analysis

Based on the analysis results and SWOT analysis diagram 4, it can be explained that the strategic direction is at the coordinate point (0,39 ; 0,44) so that it can be seen that the position between the opportunity and strength axes is in quadrant I (strong competition) meaning market development by opening geographic markets such as regional expansion, national and international, market penetration by strengthening effective and efficient promotions according to the target market, developing Biodiesel products,

future integration by increasing convenience for customers and concentric diversification by creating synergies with Biodiesel products and existing products.

The results of the analysis for the Fuel Terminal (TBBM)/Fuel Terminal can be explained that the strategic direction is at the coordinate point (2,09 ; 1,95) so that it can be seen that the position between the opportunity and strength axes is in quadrant I (strong competition) and the results of the analysis at gas stations can be explained that the direction of the strategy is at the coordinate point ((0,39 ; 0,44)) so that the position between the opportunity and strength axes can be known, namely in quadrant I (strong competition). The only difference is in ranking for the strategic priority Fuel Terminal (TBBM) in Quadrant I – (SO) Growth factor value of 4,36, Quadrant II – (WO) and Quadrant IV- (ST) strategic priority factor value stability -4.08 and Quadrant III - (WT) combination strategy priority with a factor value of 3,82, while SWOT analysis based on SPPU respondents and ranked results in Quadrant I - (SO) priority growth strategy with a factor value of 0,17, Quadrant II - (WO) value stability strategy priority – 0,15, Quadrant III – (WT) combination strategy priority value 0,16 and Quadrant IV- (ST) shrinking strategy priority with a factor value of -0,20. With the SWOT, IFE, EFE and Internal External (IE) analysis, there are factors that make a decision stronger, such as strengths, weaknesses, opportunities and threats that may occur in achievement of a goal from the activity flow process distribution of Biodiesel products. There are different values for each internal factor (SW) and External Factor (OT) from the analysis that has been carried out for Fuel Terminals for Consumers in this case Gas Station (SPBU) where the Fuel Terminal regulates the supply of Biodiesel Products at gas stations, distribution is carried out from the Fuel Terminal to gas stations. Distribution of Biodiesel is focused on distribution by car/tank truck transportation and the Implementation of a Logistics Strategy.

4 Conclusion

Biodiesel distribution process from FUEL TERMINAL to SPBU, from the results of SWOT analysis Fuel Terminal strategic priorities are in Quadrant I – (SO) Growth factor value of 4,36, Quadrant II – (WO) and Quadrant IV- (ST) strategic priority stability factor value -4,08, and Quadrant III - (WT) combination strategy priority with a factor value of 3,82, while SWOT analysis based on SPPU respondents and ranked results in Quadrant I - (SO) strategic priority Growth factor value of 0,17, Quadrant II – (WO) stability strategy priority value – 0,15, Quadrant III – (WT) combination strategy priority factor value 0,16 and Quadrant IV- (ST) shrinking strategy priority value -0,20.

There are different values for each internal factor (SW) and external factor (OT). The Fuel Terminal is at the coordinate point (2,09 ; 1,95) and the SPBU (Consumer) coordinate point (0,39 ; 0,44) and the difference between the Fuel Terminal and the gas station is (1,7 ; 1,51), although the values of the two are different, they are still between the opportunity and strength axes, namely in quadrant I (strong competition). maximally by utilizing the company's internal strengths to take advantage of external

opportunities in achieving increased business growth, but it can be seen that the position is between the opportunity and strength axes. The two analyzes produce growth strategy priorities in Quadrant I– (SO).

It is necessary to involve Stakeholders, Supervisors/Supervisors, officers who work at gas stations related to policy makers, in determining the implementation of the distribution strategy for the Central Java province according to research results with SWOT, IFE, EFE analysis in achieving a goal from the activityflow process for distributing Biosolar products.

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