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Subsidized Diesel Fuel Distribution Post-Development Of The New Region Authority Strategy

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Keywords

fuel oil, subsidies, transportation costs, linear programming, value chain, business strategy

ABSTRACT

Papua has officially been divided into 4 regions, namely Papua,Central Papua, Highlands Papua, and South Papua effective June 2022. The supply and distribution of subsidized fuel to each region has its own challenges, unpredicted weather, terrain, shallow rivers and the lack of infrastructure lead to very high operation cost. Apart from providing subsidized fuel, Pertamina has also to sell non-subsidized fuel in order to present in market competion among foreign companies that sell non-subsidized fuel in Indonesia. This research aims to evaluate, optimize and reformulate PT. Pertamina Patra Niaga strategy in managing supply and distribution of Subsidized Fuel to each region and business strategy in downsteam fuels market. The scope of this research is qualitative and quantitative descriptive and the data used are the combination of primary and secondary data. The primary data obtained through interviews and observations, and the secondary data obtained from PT. Pertamina Patra Niaga, BPH Migas, library research, journals and other literatures. The demand forecating, external environmental analysis (PESTEL), internal environmental analysis (Value Chain), industrial environmental analysis (SWOT), AHP and linear programming (LP) analysis were carried out in order to determine the alternative strategy. Based on the qualitative analysis, the result obtained that PT. Pertamina Patra Niaga has the strength of providing subsidized fuels, distribution network, sales outlets, facilities and infrastructure for distribution of subsidized fuels to all regions in Papua. PT. Pertamina Patra Niaga has high opportunity of success to win the market competition. To support the winning competition, the selected strategy that can be implemented is optimizing the subsidized diesel fuel distribution network and operational costs reduction strategy.

INTRODUCTION

Papua had officially divided into four regions, Papua, Central Papua, Highlands Papua and South Papua effective June 2022. As a new and developing province, the regional economic development will increase gradually (Ali & Purwandi, 2017). The potential of natural resources which at that time had not developed optimally, with the establishment of the New Authority Region into four provinces will receive more attention to be developed in order to increase the economic growth of these provinces so as to support the acceleration of regional development (Alashhab & Mlybari, 2021; Mollik, Rashid,

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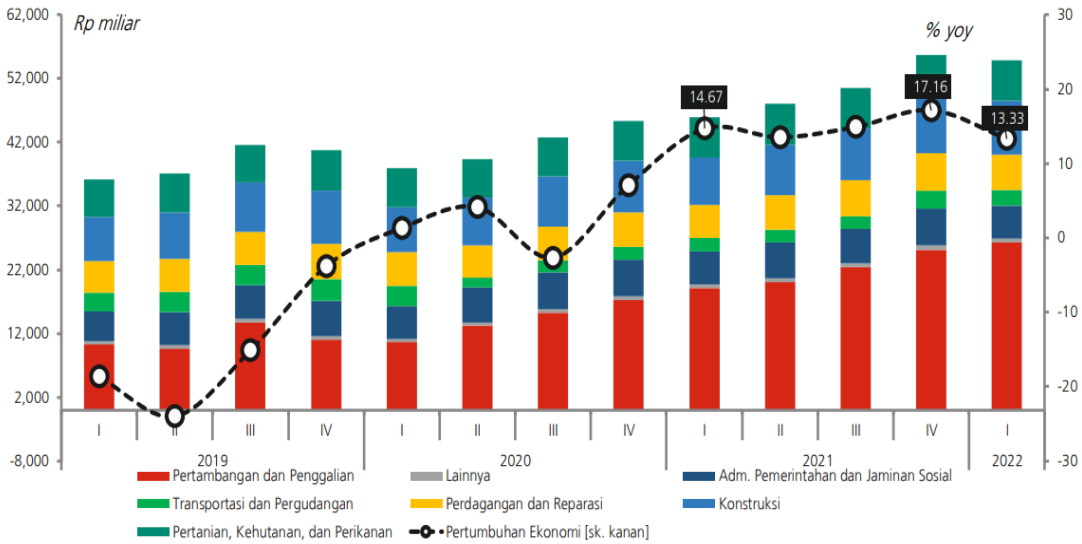
Hasanuzzaman, Karim, & Hosenuzzaman, 2016; Moner-Girona et al., 2018; Nurlathifah, Pudjiantoro, Ammar, Sutopo, & Yuniaristanto, 2020; Salazar, Ramos-Martín, & Lomas, 2018).

Growth in economic sectors such as trade, industry, mining, plantations, agriculture and fisheries will increase the need for supporting facilities and infrastructure, such as housing land, rice fields, buildings, roads, transportation facilities (goods and people), electricity, fuel originating from from the earth such as fuel oil and natural gas, as well as clean water (Hatefi, 2018)(Liperda et al., 2022). In economic development, infrastructure for transportation both land, sea and air must be fulfilled so that economic activity for the distribution of goods and services between regions in Papua, Central Papua, Highlands Papua, South Papua, and distribute goods and services to other provinces in Indonesia or for export purposes can be achieved (Djati, 2007)(Kushariyadi & Sugito, 2022)(Prawin, Fallo, Metboki, & Sipayung, 2022).

In order to rationalize energy distribution in all regions of Indonesia, the Indonesian government made a policy against the high fuel price in several regions, especially in Eastern Indonesia (Asri, 2017)(Prasetyo & Usman, 2023). Undeveloped, most-outer and most-front end (3T) area are the focus of the Government in implementing the distribution of Subsidized Fuel in the Provinces of Papua, Central Papua, Highlands Papua and South Papua. In addition, aims to support regional development to improve the economy and wealthfare the Papuan population after the development of a new authority area, a strategy for distributing subsidized fuel demand with high expecation that the distribution of subsidized fuel reach and meet the fuel demand in Papua (Ayuningtyas, Harianto, & Safari, 2019)(Miller & Dess, 1993)(Adiliya, 2019).



Sumber: www.bi.go.id

Figure 1. Graph 1 GRDP development on the business field side

Prior to formulating strategy of subsidized fuel distribution, the demand forecasting analysis will be carried out for estimating subsidized fuel up to year of 2025 and assessment of the storage capacity, fuel terminals, distribution networks and gas station (SPBU) that are currently operating (Khair, Fahmi, Al Hakim, & Rahim, 2017)(Sa'adah, Fauzi, & Juanda, 2017).

METHODS

The method used in this study includes several methods of analysis (Ul Haq, 2020). Descriptive analysis methods were used for the first and second research purposes, namely to analyze the demand forecasting, supply and distribution network of subsidized fuel in the four provinces (Adli, Prastyasari, Handani, & Artana, 2022)(Grant, Wong, & Trautrims, 2017)(Suparjo, 2017)(Arif, 2018). Descriptive analysis in writing is used to provide an explanation of the research data (Arikunto, 2006). The third research objective is to formulate a distribution strategy for subsidized fuel by using an analysis of

internal and external factors that affect the company (Aminudin, 2005)(Irawan, 2018). The formulated distribution strategy is then validated using the optimization results of linear programming (LP). Data processing in this study uses forecasting methods (forecasting - time series), PESTLE, Value Chain, EFE, IFE, IE, SWOT, AHP, Linear Programming and Ms. Office Excel (Gurl, 2017)(Hutasuhut, Anggraeni, & Tyasnurita, 2014)(Kusuma, Roestam, & Pasca, 2020)(Cooper & Schindler, 2003).

RESULTS

The fuel subsidy policy presents since the government of the President of the Republic of Indonesia, Sukarno. In 1966 the government implemented subsidies for three types of fuel, namely Premium, Solar and Kerosene. Along with the development of new authority areas, economic, social and cultural developments, people's welfare, technology and so on, the Indonesian government continues to improve the regulations and technology for controlling the distribution of subsidized fuel so that it is right on target and effective. Every year the Indonesian government determines the value and amount of subsidized fuel by considering the inflation rate, GDP, realization, purchasing power, motor vehicle growth, poverty ratio, and since 2020 the distribution of subsidized fuel to the public has been determined at the delivery point, namely the nozzle used in Gas Station (Statistik, 2021). The development of new authority areas requires support from a sustainable energy supply, one of which is subsidized fuel. Sustainable provision of subsidized fuel requires adequate means and facilities so that subsidized fuel can be distributed to the community in an appropriate manner (Chopra & Meindl, 2001). Therefore, good planning is needed in terms of storage facilities, distribution networks and gas stations.

Forecasting of Diesel Subsidized Fuel Demand

In this study, the distribution of data on the realization and quota of subsidized diesel fuel from 2020 to 2022 in the provinces of Papua, Central Papua, Highlands Papua and South Papua were obtained from the Downstream Oil and Gas Regulatory Agency. This data is validated first to ensure that it meets statistical criteria by looking for the values of the Mean Absolute Deviation (MAD), Mean Squared Error (MSE), Root Mean Squared Error (RMSE) and Mean Absolute Percentage error (MAPE)(Robial, 2018).

Table 1. Data validation of the realization and quota of subsidized diesel fuel

Validation Method		Papua	Papua Mountains	South Papua	Central Papua
MAPE %	MA	15.229	29.980	16.212	15.154
	WMA	14.302	26.788	15.603	14.443
	Exp. Smoothing	10.575	10.911	16.235	7.383

Forecasting the need for subsidized diesel fuel in four provinces is calculated using time series forecasting and exponential smoothing based on the Microsoft Excel application. The decision to use time series forecasting and exponential smoothing is based on the lowest MAPE results after comparing it with other methods such as Moving Average (MA) and Weighted Moving Average (WMA) (Table 1)(Santiari & Rahayuda, 2021).

Table 2. Forecasting the Need for Subsidized Diesel Fuel with the Forecasting Time Series and Exponential Smoothing Methods

Province	Year	Demand Forecasting (Unit Kilo Liter)		
		Low	Medium	High
Papua	2023	72,053	87,281	102,510
	2024	64,761	88,264	111,767
	2025	59,510	89,246	118,983
Papua Pegunungan	2023	8,932	10,387	11,841
	2024	9,329	11,177	13,025
	2025	9,768	11,967	14,165
Papua Selatan	2023	52,371	57,467	62,562
	2024	55,314	60,760	66,205
	2025	58,206	64,052	69,899
Papua Tengah	2023	43,099	47,604	52,108
	2024	45,516	50,027	54,538
	2025	47,921	52,451	56,980

Source: BPH Migas, Data processed by Researchers

The validation of demand forecasting for subsidized diesel fuel above, it shows that the largest MAPE value of 16.235% or far below 50% and it can be stated that the distribution of data from 2020 to 2022 can be used for predicting the demand for subsidized fuel in each province up to 2025.

Storage Tanks Capacity

Demand of subsidized diesel fuel is supplied from TBBM owned by PT. Pertamina Patra Niaga located in Wayame, Tual and PT. Pertamina Indonesia Refinery (RU Kasim)(2022). These three TBBM suppliers are the main TBBM for fuel distribution to the Eastern region of Indonesia, some of them some of them supply Biak, Merauke, Nabire, Serui, Jayapura and Timika.

Table 3. Main TBBM capacity and subsidized fuel demand

TBBM	Storage Tank Capacity at Main TBBM (KL)	Storage Tank Capacity at Hub TBBM (KL)	Total Demand Subsidize Diesel Fuel per Month (KL)
FT TUAL	10,000		
- FT MERAUKE		8,343	3,208
- JOBBER TIMIKA		1,500	1,285
Subtotal	10,000	9,843	4,492
FT WAYAME	42,000		
- FT BIAK		7,954	558
- FT NABIRE		5,455	1,297
- FT SERUI		1,093	171
- IT JAYAPURA		10,684	3,493
Subtotal	42,000	25,186	5,519
RU KASIM	3,022		
- IT JAYAPURA		2,000	1,599
Subtotal	3,022	2,000	1,599
GRAND TOTAL CAPACITY	55,022	37,029	11,610

Based on the total capacity of the storage tanks at Main TBBM (Table 3), TBBM Hub and the total demand for Subsidized Solar Fuel (Table 4), it can be concluded that the storage tank capacity is sufficient to fulfill subsidized gas oil demand.

Table 4. Transportation mode for distributing subsidized fuel to gas stations

Transportatiob Mode	Capacity (KL)	Maximum Ritase per Month	Distribution Areas					
			Biak	Serui	Jayapura	Jobber Timika	Nabire	Merauke
Air Transport	16	80			2			
Air Transport	6	60			1			1
Air Transport	4	80			2	1		
Air Transport	1.2	80			3		2	
Marine Tanker	350	4	1	1		1	1	1
Road Tanker	4	24				5	5	
Road Tanker	5	24	6	5	8	10	10	32
Road Tanker	8	24						10
Road Tanker	10	24	2		12	5	5	4
Road Tanker	16	24			9	4	4	
Road Tanker	20	24				1	1	
Total Trasportation	Unit		9	6	37	27	28	48
Total Capacity	KL		2,600	2,000	11,144	6,616	6,488	8,480
Total Demand	KL		558	171	5,092	1,285	1,297	3,208

External Factor Strategic

Analysis of PT activities. Pertamina Patra Niaga is divided into two categories, namely main activities and supporting activities. The main activities consist of inbound logistics, operations, outbound logistics, marketing and sales, and service. Meanwhile, supporting activities consist of infrastructure, human resource management, technology development and purchasing. PESTLE analysis is used to analyze external factors (Political, Economic, Sociological, Technological, Legal and Environmental) that influence a company. PESTLE analysis is carried out independently of external factors and their impacts so that companies can use them to create various different scenarios.

PESTLE analysis is used to analyze external factors that influence a company and then determine the company's strength so that it can compete with its competitors. The results of the PESTLE analysis are summarized in Table 5.

Table 5. Summary of PESTLE Analysis

Analysis	External Environmental Factors	Implications for Company	Opportunity/Threats
Politic	Government determination of low selling price of subsidized fuel.	Price disparity is getting higher, consumption of subsidized fuel is increasing, sales of non-subsidized fuel are decreasing	Opportunity
	World oil prices are unstable.	Fuel production costs from refineries increase.	Threats
Economy	The growth of motorized vehicles requires quality fuel.	Increased purchasing power for quality fuel and NFR products.	Opportunity
	Availability of substitute products for subsidized fuel.	Marketing alternative fuels and NFR that are quality and environmentally friendly.	Opportunity
Social	New Area Development (DOB)	Increase in non-cash purchases, prefer quality products that are quick to obtain and safe to use.	Opportunity
Technology	Technological development.	The use of social media, online services throughout the region, guarantees security and is easily accessible to all groups.	Threats
	Petroleum production is declining both in Indonesia and in the world.	Increasing the use of biofuel and ethanol as a fuel mixture, this will increase the company's operational costs.	Threats
Legal	Central and regional permits do not yet support each other.	Slowing down the licensing process to develop marketing tools and facilities.	Threats
Environment	Fuel supply from quality imports.	Development of fuel products using Biofuel or Bioethanol and NFR products	Opportunity

	The quality guarantee offered by competing companies is higher.	Maintaining fuel quality to consumer users by implementing strict QC.	Threats

The external environmental strength factors identified from the PESTLE analysis are then used to analyze PT's external strategic factors. Pertamina Patra Niaga uses the EFE matrix, obtaining a total weighted value of 3.40 (Table 6). This value shows that the company's external conditions are in a moderate position in responding to opportunities and threats.

Table 6. External Factor Evaluation Matrix (EFE)

Key External Factors		Weight	Rangking	Weighted Score
Opportunities				
1	New Authority Development (DOB)	0.12	4	0.47
2	Government determination of low selling price of subsidized fuel.	0.09	3	0.28
3	Fuel supply from quality imports.	0.09	3	0.28
4	Availability of substitute products for subsidized fuel.	0.09	3	0.28
5	The growth of motorized vehicles requires quality fuel.	0.12	4	0.47
	Subtotal	0.51		
Threats				
1	Some of central and regional regulations have not yet align.	0.07	2	0.14
2	Technological development.	0.12	4	0.47
3	World oil prices are unstable.	0.09	3	0.28
4	Petroleum production is declining both in Indonesia and in the world.	0.12	4	0.47
5	The quality guarantee offered by competing companies is higher.	0.09	3	0.28
	Subtotal	0.49		
Total		1.00		3.40

Internal Factor Strategic

Analysis of PT's internal activities. Pertamina Patra Niaga is divided into two categories, namely main activities and supporting activities. The main activities consist of inbound logistics, operations, outbound logistics, marketing and sales, and service. Supporting activities consist of infrastructure, human resource management, technology development and purchasing. From the results of the value chain analysis, five competitive advantages and five weaknesses were identified (Figure 1).

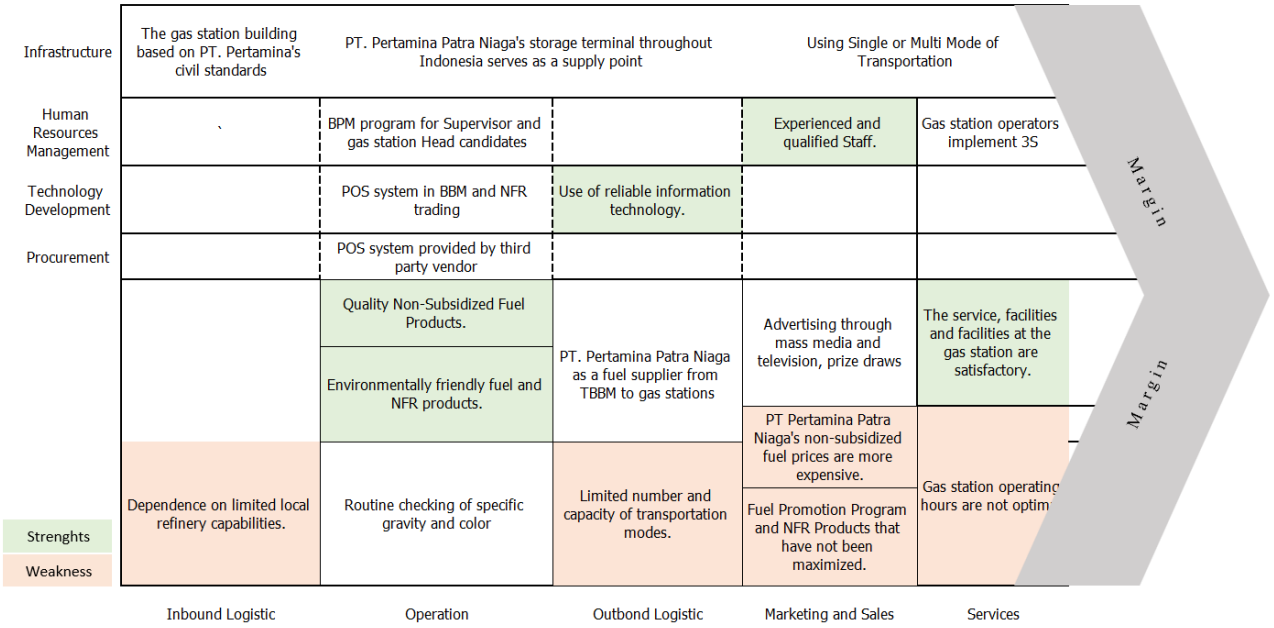


Figure 2. Summary of Value Chain Analysis

The five strengths and five weaknesses identified from the results of the value chain analysis are then used as the company's main internal factors using the IFE matrix (Table 7).

Tabel 7. Internal Factor Evaluation Matrix (IFE)

Key Internal Factors		Weight	Rangking	Weighted Score
Strenghts				
1	Quality Non-Subsidized Fuel Products.	0.10	3	0.29
2	The service, facilities and facilities at the gas station are satisfactory.	0.10	3	0.29
3	Experienced and qualified Staff.	0.10	4	0.39
4	Environmentally friendly fuel and NFR products.	0.12	4	0.49
5	Use of reliable technology information.	0.12	4	0.49
	Subtotal	0.54		
Weakness				
1	PT Pertamina Patra Niaga's non-subsidized fuel prices are more expensive.	0.07	1	0.07
2	Fuel Promotion Program and NFR Products that have not been maximized.	0.10	2	0.20
3	Gas station operating hours are not optimal.	0.10	1	0.10
4	Limited number and capacity of transportation modes.	0.12	2	0.24
5	Reliance to limited local refinery capabilities.	0.07	2	0.15
	Subtotal	0.46		
Total		1.00		2.71

The results of the IFE matrix analysis show that the total score from the IFE matrix is 2.71. This shows that internal conditions are in a strong position in utilizing strengths and overcoming weaknesses.

Company Position and Alternative Strategy

The results of the EFE and IFE matrices are then used to map the company's position using the IE matrix. It can be seen that the company is in quadrant II (Figure 2), where according to David (2011) the company is in a state of growth and build.

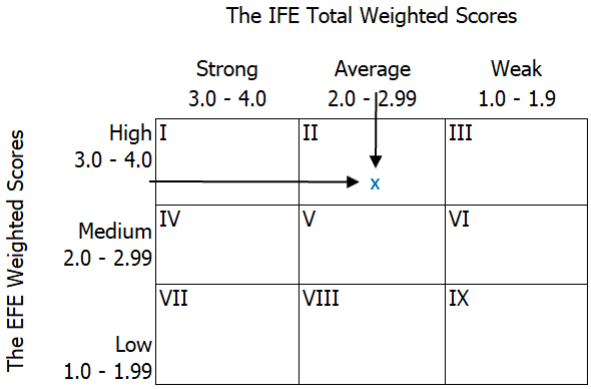


Figure 3. IE Matrix PT. Pertamina Patra Niaga

The TOWS matrix is a continuation of EFE, IFE and IE, namely by matching opportunity, threat, strength and weakness factors to obtain alternative strategies for the company. Eight alternative strategies that can be used by companies have been identified (Table 8). Each alternative strategy is then validated by comparing it with the results of optimization of the subsidized fuel distribution network.

INTERNAL FACTORS / EXTERNAL FACTORS		STRENGTH (S)		WEAKNESS (W)
	1	Quality Non-Subsidized Fuel Products.	1	PT Pertamina Patra Niaga's non-subsidized fuel prices are more expensive.
	2	The service, facilities and facilities at the gas station are satisfactory.	2	Fuel Promotion Program and NFR Products that have not been maximized.
	3	Has experienced human resources.	3	Gas station operating hours are not optimal.
	4	Has environmentally friendly fuel and NFR products.	4	Limited size and capacity of fuel transportation.
	5	Use of reliable information technology.	5	Reliance on limited local refinery capabilities.
OPPORTUNITIES (O)		**Stratergy - SO**		**Strategy - WO**
1	New Area Development (DOB)	1. Marketing subsidized fuel, non-subsidized fuel and NFR products that are having quality and environmentally friendly at gas stations (S1, S4, O3, O4) 2. Improve integrated information systems that are easy to access and secure (S2, S3, S5, O1, O2, O5)		5. Optimize distribution networks and reduce operational costs (W1, W4, W5, O1, O3, O4) 6. Increase promotion, services and facilities (W2, W3, O2, O5)
2	Government determination of low selling price of subsidized fuel.			
3	Fuel supply from quality imports.			
4	Availability of substitute products for subsidized fuel.			
5	The growth of motorized vehicles requires quality fuel.			
THREATS (T)		**Strategy - ST**		**Strategy - WT**
1	Some of central and regional regulations have not yet align.	3. Streamline distribution operational costs by using the latest technology (S2, S3, S5, T1, T2, T3) 4. Utilizing alternative fuels (FAME and Ethanol) to reduce the use of fossil fuels (S1, S4, T4, T5)		7. Improve human resources competency (W3, W4, T1, T5) 8. Rationalize R & D differentiation of BBM and NFR products (W1, W2, W5, T2, T3, T4)
2	Technological development.			
3	The world oil price is not stable.			
4	Petroleum production is declining both in Indonesia and in the world.			
5	The quality guarantee offered by competing companies is higher.			

Figure 4. TOWS Matrix PT. Pertamina Patra Niaga

Strategy Priority

An analytic hierarchy process (AHP) multi-criteria decision-making methodology is then developed to take into TOWS result. By using AHP methodology the strategy of optimizing the distribution network and reducing operational costs for sending diesel fuel subsidies is the main priority factor, having the highest priority ranking of 16.94% compared to other strategies. The second priority was identified as a strategy to increase the supply of quality fuel using the latest technology with a priority ranking of 15.16%. The third ranking priority was identified in the strategy of utilizing alternative fuels (FAME and Ethanol) to reduce the use of fossil fuels.

Matrix	1 Marketing subsidized fuel, non-subsidized fuel and NFR	2 Improve integrated information systems that are easy to	3 Streamline distribution	4 Utilizing alternative fuels (FAME and Ethanol) to reduce	5 Optimize distribution networks and reduce operational costs	6 Increase promotion, services and facilities	7 Improve human resources competency	8 Rationalize R & D differentiation of BBM and NFR products	9 0	10 0	normalized principal Eigenvector
1 Marketing subsidized fuel,	-	4/5	1/2	2/3	5/7	1 2/3	8/9	1 2/5	-	-	11.08%
2 Improve integrated	1 1/4	-	7/9	7/9	7/9	1	1 1/7	1 3/4	-	-	12.41%
3 Streamline distribution	1 5/6	1 2/7	-	1	5/6	1 1/4	1 1/4	1 6/7	-	-	15.16%
4 Utilizing alternative fuels	1 1/2	1 2/7	1	-	4/5	1 1/3	1 1/3	1 2/3	-	-	14.54%
5 Optimize distribution	1 2/5	1 2/7	1 1/5	1 1/4	-	2	1 1/9	2 3/8	-	-	16.94%
6 Increase promotion,	3/5	1	4/5	3/4	1/2	-	1	1	-	-	10.10%
7 Improve human resources	1 1/9	7/8	4/5	3/4	8/9	1	-	1 4/5	-	-	12.01%
8 Rationalize R & D differentiation	5/7	4/7	1/2	3/5	3/7	1	5/9	-	-	-	7.76%
0 9	-	-	-	-	-	-	-	-	-	-	0.00%
0 10	-	-	-	-	-	-	-	-	-	-	0.00%

Figure 5. Matrixs AHP

Distribution Network Optimization

Distribution network optimization is carried out for land, sea and air transportation from TBBM Utama to TBBM Hub, and from TBBM Hub to gas stations. In linear programming, the objective function and constraints are determined, namely minimizing total transportation costs while meeting the constraints on the number of deliveries being less than or equal to the amount of fuel at the TBBM Hub and the number of deliveries being less than or equal to the fuel requirements at gas stations. The mathematical model of the objective function and its constrains are as follows:

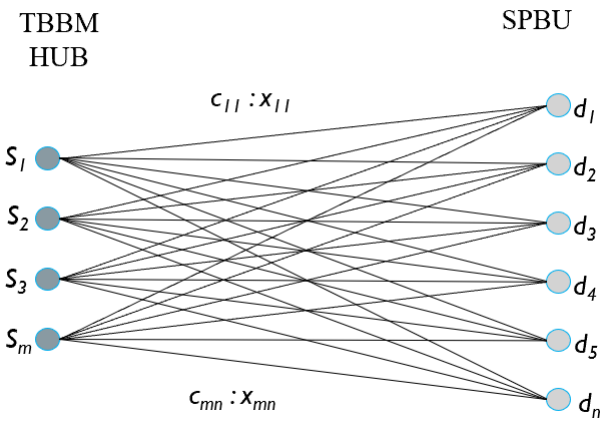


Figure 6. Reprsentation of distribution problem

Objective function:

$$Minimal: \quad z = \sum_{i=1}^{m} \sum_{j=1}^{n} c_{ij}\, x_{ij}$$

Constrains:

$$\sum_{j=1}^{n} x_{ij} \leq S_i; i = 1, 2, \ldots\ldots, m$$

$$\sum_{i=1}^{m} x_{ij} \leq d_j; j = 1, 2, \ldots\ldots, n$$

$$x_{ij} \geq 0 \; for \; all \; i \; and \; j$$

Explanation:

m = TBBM Hub

n = SPBU

c_{ij} = transportation cost per liter

x_{ij} = volume of supply BBM Subsidi

S_i = volume of BBM Subsidi at TBBM Hub

d_j = volume of demand at SPBU

Table 8. Comparison of Average Ritases per Month

Transportation Mode	Capacity (KL)	Total (Unit)	Total Volume (KL)	Before Optimization		After Optimization	
				Average Ritase per Month	Percentage of Utilization	Average Ritase per Month	Percentage of Utilization
Road Tanker	4	10	40	47	5.19%	90	9.93%
Road Tanker	5	71	355	394	43.49%	469	51.77%
Road Tanker	8	10	80	129	14.24%	38	4.19%
Road Tanker	10	28	280	251	27.70%	183	20.20%
Road Tanker	16	17	272	55	6.07%	128	14.13%
Road Tanker	20	2	40	30	3.31%	34	3.75%

Optimizing the road tankers transportation modes, it is found that the average potential efficiency for operational costs reduction per month is IDR. 220,840,000.

CONCLUSION

Forecasting the need for subsidized fuel using time series forecasting analysis and exponential smoothing shows that the need for fuel up to 2025 in kilo liters is 89,246 (Papua Province), 11,967 (Mountain Papua Province), 64,052 (South Papua Province) and 52,452 (Central Papua Province), and the average need for gas oil subsidized fuel in each province has increased from 1.1% to 7.1%.

The total tank capacity at TBBM Utama is 55,022 kilo liters, sufficient to supply subsidized fuel to TBBM Hub amounting to 37,029 kilo liters spread across four provinces, sufficient to store the need for gas oil subsidized fuel from each gas station with a total requirement of 11,610 kilo liters per month.

The current capacity of transportation modes is very sufficient, but the distribution of subsidized fuel often experiences delays. This is caused by a lack of control over some land, sea and air transportation modes, land transportation modes that are suitable for operation, vehicles used for the industrial sector, limited number of drivers, constraints on spare parts availability and vehicle age. From optimizing the distribution mode using land transportation, the potential for operational transportation cost efficiency of Rp. 220,840,000 per month.

Selection of strategy from eight alternative strategies obtained from the TOWS Matrix using AHP, the strategy chosen is optimize the distribution network and reduce operational costs strategy.

REFERENCES

Adiliya, Ana. (2019). Port maritime connectivity in South-East Indonesia: A new strategic positioning for transhipment port of Tenau Kupang. *The Asian Journal of Shipping and Logistics*, *35*(4), 172–180. https://doi.org/10.1016/j.ajsl.2019.12.004

Adli, A. W. S., Prastyasari, F. I., Handani, D. W., & Artana, K. B. (2022). LNG Distribution Optimization using Set Partitioning Problem Method. *IOP Conference Series: Earth and Environmental Science*, *972*(1), 12082. https://doi.org/10.1088/1755-1315/972/1/012082

Alashhab, M. S., & Mlybari, E. A. (2021). Developing a multi-item, multi-product, and multi-period supply chain planning optimization model. *Indian Journal of Science and Technology*, *14*(37), 2850–2859. https://doi.org/10.17485/IJST/v14i37.867

Ali, Hasanuddin, & Purwandi, Lilik. (2017). *Milenial nusantara*. Gramedia Pustaka Utama.

Aminudin, H. (2005). Prinsip-prinsip Riset Operasi. *Jakarta: Erlangga*.

Arif, Muhammad. (2018). *Supply Chain Management*. Deepublish.

Arikunto, Suharsimi. (2006). 2010 Prosedur Penelitian suatu Pendekatan Praktik. *Jakarta: Rhineka Cipta*.

Asri, Rishal. (2017). *Proyeksi Jangka Panjang Kebutuhan Energi Sulawesi Selatan Menggunakan Skenario Sistem Energi Bersih*. https://doi.org/10.14710/jbs.28.1.56-78

Ayuningtyas, Maharani, Harianto, Harianto, & Safari, Arief. (2019). Pengembangan Strategi Pada Aktivitas Rantai Nilai Panas Bumi (Studi Pada PT Geo Dipa Energi (Persero)). *JURNAL BISNIS STRATEGI*, *28*(1), 56–78. https://doi.org/10.14710/jbs.28.1.56-78

Chopra, Sunil, & Meindl, Peter. (2001). Strategy, planning, and operation. *Supply Chain Management*, *15*(5), 71–85.

Cooper, Donald R., & Schindler, Pamela S. (2003). *Business research methods McGraw-hill: New york*.

David, Fred R. (2011). *Strategic management concepts and cases*. Pearson.

Djati, Bonett Satya Lelono. (2007). Simulasi Teori dan Aplikasinya. *Yogyakarta: Andi*.

Grant, David B., Wong, Chee Yew, & Trautrims, Alexander. (2017). *Sustainable logistics and supply chain management: principles and practices for sustainable operations and management*. Kogan Page Publishers.

Gurl, Emet. (2017). *SWOT analysis: A theoretical review*.

Hatefi, S. M. (2018). Strategic planning of urban transportation system based on sustainable development dimensions using an integrated SWOT and fuzzy COPRAS approach. *Global Journal of Environmental Science and Management*, *4*(1), 99–112. https://doi.org/10.22034/gjesm.2018.04.01.010

Hutasuhut, Amira Herwindyani, Anggraeni, Wiwik, & Tyasnurita, Raras. (2014). Pembuatan aplikasi pendukung keputusan untuk peramalan persediaan bahan baku produksi plastik blowing dan inject menggunakan metode ARIMA (Autoregressive Integrated Moving Average) di CV. Asia. *Jurnal Teknik ITS*, *3*(2), A169–A174.

Indriaty, Lulu. (2022). SISTEM PENDISTRIBUSIAN BAHAN BAKAR MINYAK (BBM) PT. PERTAMINA OLEH CV. ANUGERAH BERSAMA DI KAMPUNG ASIKI DISTRIK JAIR KABUPATEN MERAUKE. *Jurnal Ekonomi Dan Bisnis*, *13*(2), 36–41. https://doi.org/10.55049/jeb.v13i2.97

Irawan, Irawan. (2018). Analysis Of Shipâ€™s Operating Costs For Fuel Distribution In Eastern Indonesia Region. *Advances in Transportation and Logistics Research*, *1*, 1300–1309. https://doi.org/10.25292/atlr.v1i1.121

Khair, Ummul, Fahmi, Hasanul, Al Hakim, Sarudin, & Rahim, Robbi. (2017). Forecasting error calculation with mean absolute deviation and mean absolute percentage error. *Journal of Physics: Conference Series*, *930*(1), 12002. https://doi.org/10.1088/1742-6596/930/1/012002

Kushariyadi, Kushariyadi, & Sugito, Bambang. (2022). Optimasi Distribusi Transportasi Bahan Bakar Minyak (BBM) Jenis Bio Solar di Wilayah Jawa Tengah. *NUSANTARA: Jurnal Ilmu Pengetahuan Sosial*, *9*(2), 162–169. https://doi.org/10.31004/jpdk.v4i5.6776

Kusuma, Nita, Roestam, Muhammad, & Pasca, Lilia. (2020). The analysis of forecasting demand method of linear exponential smoothing. *International Journal of Educational Administration, Management, and Leadership*, 7–18.

Liperda, Rahmad Inca, Hardianti, Ismara Khubby, Widyah, Intan Nur, Rahmadini, Ayunda, Fadjri, Nia Azi, & Agustin, Rifqi Rahmadanti. (2022). Simulasi-Optimasi Sistem Transportasi Penentuan Kebutuhan Truk Tangki Pada Proses Distribusi BBM: Studi Kasus TBBM Plumpang. *JISI: Jurnal Integrasi Sistem Industri*, *9*(2), 92–102. https://doi.org/10.24853/jisi.9.2.92-102

Miller, Alex, & Dess, Gregory G. (1993). Assessing Porter's (1980) model in terms of its generalizability, accuracy and simplicity. *Journal of Management Studies*, *30*(4), 553–585. https://doi.org/10.1111/j.1467-6486.1993.tb00316.x

Mollik, Sazib, Rashid, M. M., Hasanuzzaman, M., Karim, M. E., & Hosenuzzaman, M. (2016). Prospects, progress, policies, and effects of rural electrification in Bangladesh. *Renewable and Sustainable Energy Reviews*, *65*, 553–567. https://doi.org/10.1016/j.rser.2016.06.091

Moner-Girona, M., Solano-Peralta, M., Lazopoulou, M., Ackom, E. K., Vallve, X., & Szabó, S. (2018). Electrification of Sub-Saharan Africa through PV/hybrid mini-grids: Reducing the gap between current business models and on-site experience. *Renewable and Sustainable Energy Reviews*, *91*, 1148–1161. https://doi.org/10.1016/j.rser.2018.04.018

Nurlathifah, Euis, Pudjiantoro, Fathin Kusumo Pramesti, Ammar, Naufal, Sutopo, Wahyudi, & Yuniaristanto, Yuniaristanto. (2020). Optimalisasi rute distribusi bbm dengan penerapan capacitated vehicle routing problem dan excel solver di kabupaten magetan. *Teknoin*, *26*(2), 116–126. https://doi.org/10.20885/teknoin.vol26.iss2.art3

Prasetyo, Erwin Indra, & Usman, Indrianawati. (2023). Optimalisasi Jumlah dan Lokasi Gudang Distribusi Pupuk Bersubsidi di Jawa Timur Akibat Perubahan Regulasi Pemerintah. *Jurnal Manajemen Dan Inovasi (MANOVA)*, *6*(1), 105–121. https://doi.org/10.15642/manova.v6i1.1176

Prawin, Dina Lorensa, Fallo, Yosefina Marice, Metboki, Bernadina, & Sipayung, Boanerges Putra. (2022). Efektivitas Distribusi Pupuk Bersubsidi di Kecamatan Biboki Monleu Kabupaten Timor Tengah Utara (Studi Kasus Desa Oepuah). *Prosiding Seminar Nasional Pembangunan Dan Pendidikan Vokasi Pertanian*, *3*(1), 118–137.

Robial, Siti Muawanah. (2018). Perbandingan Model Statistik Pada Analisis Metode Peramalan Time Series:(STUDI KASUS: PT. TELEKOMUNIKASI INDONESIA, TBK KANDATEL SUKABUMI). *SANTIKA Is a Scientific Journal of Science and Technology*, *8*(2), 823–838. https://doi.org/10.37150/jsa.v8i2.400

Sa'adah, Ana Fitriyatus, Fauzi, Akhmad, & Juanda, Bambang. (2017). Peramalan penyediaan dan konsumsi bahan bakar minyak indonesia dengan model sistem dinamik. *Jurnal Ekonomi Dan Pembangunan Indonesia*, *17*(2), 2. https://doi.org/10.21002/jepi.v17i2.661

Salazar, Oswaldo Viteri, Ramos-Martín, Jesús, & Lomas, Pedro L. (2018). Livelihood sustainability assessment of coffee and cocoa producers in the Amazon region of Ecuador using household types. *Journal of Rural Studies*, *62*, 1–9. https://doi.org/10.1016/j.jrurstud.2018.06.004

Santiari, Ni Putu Linda, & Rahayuda, I. Gede Surya. (2021). Analisis perbandingan metode single exponential smoothing dan single moving average dalam peramalan pemesanan. *Jurnal Informatika Universitas Pamulang*, *6*(2), 312–318. https://doi.org/10.32493/informatika.v6i2.10135

Statistik, Badan Pusat. (2021). Berita resmi statistik. *Bps. Go. Id*, *27*, 1–52.

Suparjo, Suparjo. (2017). Metode Saving Matrix Sebagai Alternatif Efisiensi Biaya Distribusi (Studi Empirik Pada Perusahaan Angkutan Kayu Gelondongan Di Jawa Tengah). *Media Ekonomi Dan Manajemen*, *32*(2). https://doi.org/10.24856/mem.v32i2. 513

Ul Haq, Dliyaa. (2020). *Analisis Formulasi Strategi Pengembangan Bisnis Virtual Gas Pipeline (CNG & LNG).* IPB university.