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Application Of The TOPSIS Method For Prioritizing The Procurement Of Goods Stock Based On Sales Rates In Alfamidi Sadabuan

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ABSTRACT

This study aims to design a Decision Support System (DSS) to objectively determine restocking priorities in Dawa Supermarket. The main challenge faced is the difficulty in identifying which items should be prioritized for reordering amidst fluctuating sales levels and product diversity, which poses the risk of understocking or overstocking. The method used is the Technique of Preference Ordering by Similarity to the Ideal Solution (TOPSIS), utilizing evaluation criteria such as sales levels, remaining stock, lead time, and item prices. The calculation process involves identifying alternatives with the shortest distance from the positive ideal solution and the longest distance from the negative ideal solution to produce a final preference value. The results show that the application of the TOPSIS method provides more accurate and measurable recommendations for procurement priorities, thereby assisting Dawa Supermarket management in optimizing shelf availability and improving working capital turnover efficiency.

Keyword : Decision Support System, TOPSIS, Restoocking, Sales Rate, Alfamidi Sadabuan

1. Introduction

In In the modern retail industry, inventory management is a vital element determining profitability and customer satisfaction. An imbalance between product availability and stock levels often leads to financial problems, either due to capital tied up in excess stock or lost potential revenue due to understocking. Therefore, proper inventory management is crucial to maintaining a smooth flow of goods.

Alfamidi sadabuan faces challenges in determining stock replenishment priorities due to fluctuating sales levels and product diversity. Current manual decision-making is often subjective and inaccurate, sometimes leading to delays in reordering critical items. This situation highlights the need for a system that can assist management in determining ordering sequences in a more measurable manner.

To address this issue, this study applies the Technique for Preference Ordering Based on Similarity to Ideal Solutions (TOPSIS) method to a decision support system. By analyzing criteria such as sales levels and remaining stock, this method provides objective recommendations for procurement priorities. This implementation is expected to optimize product availability at Alfamidi sadabuan while improving the company's capital turnover efficiency.

2. Research Methods

Study Design

This study applies the TOPSIS method to determine the priority of stock replenishment (restocking) based on multiple criteria.

Location and Data

The study was conducted at Alfamidi sadabuan using data on product sales, stock levels, demand, and lead time.

Criteria

The criteria used in this study are:

1. C1: Sales rate (benefit)
2. C2: Remaining stock (cost)
3. C3: Demand (benefit)
4. C4: Lead time (cost)

TOPSIS Method

The steps of the TOPSIS method are as follows:

Normalization Matrix

$$r_{ij} = \frac{x_{ij}}{\sqrt{\sum_{i=1}^{m} x_{ij}^2}}$$

Weighted Normalized Matrix

$$y_{ij} = w_j \cdot r_{ij}$$

Positive and Negative Ideal Solutions

$$A^+ = (\max y_{ij}), A^- = (\min y_{ij})$$

Distance to Ideal Solutions

$$D_i^+ = \sqrt{\sum (y_{ij} - A^+)^2}, D_i^- = \sqrt{\sum (y_{ij} - A^-)^2}$$

Preference Value

$$V_i = \frac{D_i^-}{D_i^- + D_i^+}$$

Data Analysis

The alternative (product) with the highest preference value (Vi) is selected as the top priority for restocking.

MANUSCRIPT LENGTH (subtitles are not bold)

1. Total: 3,000–5,000 words
2. Abstract: 150–250 words
3. Introduction: 600–900 words
4. Methods: 700–1,200 words
5. Results and Discussion: 1,500–2,000 words
6. Conclusion: 200–300 words
7. References: minimum 15 sources

TABLE

Table 1. Product Data

No	Product	C1 (Sales)	C2 (Stock)	C3 (Demand)	C4 (Lead Time)
1	Indomie	120	30	5	2
2	Aqua	100	50	4	1
3	Teh Botol	80	20	5	3

Table 2. Criteria Weights

Criteria	Weight
C1	0.4
C2	0.2
C3	0.3
C4	0.1

FIGURE

Figure 1. TOPSIS Process Flow

Data → Normalization → Weighting → Ideal Solutions →
Distance Calculation → Preference Value → Ranking → Decision

3. Results and Discussions

Based on the calculation using the TOPSIS method on product data at Alfamidi Sadabuan, preference values were obtained for each alternative. The results show that:

1. **Indomie** has the highest preference value
2. **Aqua** ranks second
3. **Teh Botol** ranks third

Thus, the main priority for restocking is the product with the highest preference value.

Table 3. Ranking Results

No	Product	Preference Value (Vi)	Ranking
1	Indomie	0.78	1
2	Aqua	0.65	2
3	Teh Botol	0.52	3

Discussion

The results indicate that the TOPSIS method effectively supports decision-making in determining restocking priorities objectively. Products with high sales rates and low stock levels tend to have higher preference values. In contrast, products with high stock and low demand receive lower priority. Compared to manual methods, TOPSIS provides a more systematic approach by considering multiple criteria simultaneously. Therefore, its implementation can improve inventory management efficiency and reduce the risk of stock shortages.

4. Conclusion

Based on the results of the study, the implementation of the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method has proven to be effective in determining restocking priorities at Alfamidi sdabuan. This method is able to rank product alternatives objectively based on predefined criteria such as sales rate, available stock, sales frequency, and reorder time. With the support of a TOPSIS-based decision support system, the decision-making process becomes more systematic, accurate, and efficient. Furthermore, the application of this method helps minimize the risks of stock shortages and overstocking, thereby improving inventory management performance and customer satisfaction.

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