JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol XII No 3, June 2026, hlm. 423 – 428 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v12i3.4443
Available online at https://jurnal.stmikroyal.ac.id/index.php/jurteksi

OPTIMIZATION OF FAST-MOVING DRUG INVENTORY USING THE WEIGHTED PRODUCT METHOD AT ANNISA DRUGSTORE

Rafika Dayanti[1*], Neni Mulyani[1], Ahmad Muhazir[1]
[1]Information System, Universitas Royal
email: *rafikadayanti796@gmail.com

Abstract: Managing fast-moving drug inventory requires accurate supplier selection to ensure product availability and minimize the risk of overstock and out-of-stock conditions. At Annisa Pharmacy, the supplier selection process has traditionally relied on experience and subjective judgment, which may lead to less optimal decisions. This study aims to design and implement a Decision Support System (DSS) for selecting fast-moving drug suppliers using the Weighted Product (WP) method. The WP method is applied because it is capable of processing multiple criteria simultaneously through structured weighting, including demand frequency, delivery lead time, remaining shelf life, purchase price, and profit margin. The system is developed as a web-based application using PHP and MySQL. The results show that the implementation of the Weighted Product method successfully produces preference values and accurate supplier rankings, enabling the system to correctly determine the most optimal fast-moving drug supplier based on the defined criteria. Therefore, the developed system can assist the owner of Annisa Pharmacy in making more precise, objective, and structured inventory procurement decisions.

Keywords: decision support system; drug inventory; supplier selection; weighted product

Abstrak: Pengelolaan stok obat fast moving di Toko Obat Annisa memerlukan ketepatan dalam menentukan supplier agar ketersediaan obat tetap terjaga dan risiko overstock maupun out of stock dapat diminimalkan. Selama ini, proses pemilihan supplier masih dilakukan secara konvensional berdasarkan pengalaman, sehingga berpotensi menghasilkan keputusan yang kurang optimal. Penelitian ini bertujuan untuk merancang dan mengimplementasikan Sistem Pendukung Keputusan (SPK) pemilihan supplier obat *fast moving* menggunakan metode Weighted Product (WP). Metode WP digunakan karena mampu mengolah beberapa kriteria secara simultan melalui pembobotan yang terstruktur, meliputi frekuensi permintaan, lead time, sisa masa kedaluwarsa, harga beli, dan margin keuntungan. Sistem dikembangkan berbasis web menggunakan bahasa pemrograman PHP dan basis data MySQL. Hasil penelitian menunjukkan bahwa penerapan metode Weighted Product mampu menghasilkan nilai preferensi dan perankingan supplier secara objektif, sehingga sistem berhasil menentukan supplier obat fast moving yang paling optimal sesuai dengan kriteria yang telah ditetapkan. Dengan demikian, sistem yang dibangun dapat membantu pemilik Toko Obat Annisa dalam mengambil keputusan pengadaan stok obat secara lebih tepat, objektif, dan terstruktur.

Kata kunci: sistem pendukung keputusan; toko obat; pemilihan pemasok; weighted product

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol XII No 3, June 2026, hlm. 423 – 428 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v12i3.4443
Available online at https://jurnal.stmikroyal.ac.id/index.php/jurteksi

INTRODUCTION

The rapid development of information technology has made digital transformation a fundamental requirement in strategic business decision-making, including in the healthcare sector. Inventory management of pharmaceutical products requires accurate and data-driven decisions to ensure product availability while improving operational efficiency. This process involves a careful evaluation of various factors, including quality, price, suitability to organizational needs, brand reputation, and customer reviews [1].

Several previous studies have applied MCDM methods in various contexts. Renaldo et al. emphasized the importance of integrating data-driven systems to enhance organizational decision quality, yet their study did not specifically address pharmaceutical inventory management[2]. Putro et al. compared several MCDM methods and demonstrated differences in ranking sensitivity; however, their focus was limited to methodological comparison rather than practical implementation[3]. Rafiqi et al. validated the effectiveness of the Weighted Product (WP) method in vendor selection, although the application was restricted to the IT sector [4].

Nasution et al. combined WP with a fuzzy approach to increase flexibility in decision-making but did not integrate it into inventory sustainability strategies[5]. Meanwhile, Komputer et al. applied the SAW method for determining drug stock quantities, yet did not incorporate supplier performance evaluation into procurement optimization. Decision Support System is required to assist in solving semi-structured problems by simultaneously considering multiple criteria[6].

Building upon these previous findings, this study not only applies the Weighted Product (WP) method within a Decision Support System framework but also strengthens the validity of the results through statistical comparison. The outcomes generated from the WP calculation are subsequently aligned with computations performed using SPSS based on the value of each criterion and the V vector to determine the best alternative ranking as the final decision[7]. The integration of the Weighted Product method into a Decision Support System enables a more objective and consistent drug inventory procurement process. The Weighted Product (WP) method applies a multiplicative calculation approach and differs from the Simple Additive Weighting (SAW) method in the initial treatment of the decision attribute evaluation results, which allows the WP method to provide a more proportional assessment in multi-criteria decision-making processes[8].

A research gap exists in the limited integration of supplier evaluation and fast-moving drug inventory indicators within a unified decision framework, especially at the community drugstore level. Therefore, this research develops a web-based Decision Support System using the Weighted Product method based on five criteria: demand frequency, lead time, remaining shelf life, purchase price, and profit margin to optimize supplier selection for fast-moving drugs at Annisa Drugstore.

METHOD

This framework represents the steps that will be carried out to solve the problems discussed in this study. The research framework is illustrated in the figure below.

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol XII No 3, June 2026, hlm. 423 – 428 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v12i3.4443
Available online at https://jurnal.stmikroyal.ac.id/index.php/jurteksi

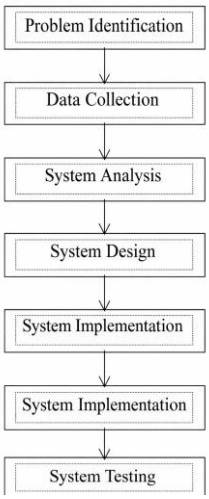

Image 1. Research Framework

The research methodology is structured into several sequential stages to ensure that the problem-solving process is carried out systematically. The initial stage begins with the identification of problems related to the management of fast-moving drug inventory at Annisa Drugstore. Subsequently, relevant data are collected, including operational data and supporting data required in the decision-making process.

In this context, proper data management is essential, as one of the standards of data management involves the administration of database systems related to maintenance and development, which aims to manage and monitor data availability during its use [9]. These data are then processed in the system analysis stage to identify system requirements and formulate appropriate solutions.

A Decision Support System is designed and implemented by integrating the Weighted Product method to determine the best alternative. The final stage involves system testing to evaluate performance and ensure the recommendations align with the research objectives. The Weighted Product (WP) method is chosen because its concept is simple and easy to understand, making it suitable for decision-making involving single and criteria[10].

RESULT AND DISCUSSION

The objects of this study are suppliers that provide fast-moving drug inventory, which include the following:

Tabel 1. Alternative

Alternative	Code
PT Kalbe Farma Tbk	A1
PT Kimia Farma Tbk	A2
PT Industri Jamu dan Farmasi Sido Muncul Tbk	A3
PT Bio Farma (Persero)	A4
PT Dexa Medica	A5
PT Phapros Tbk	A6
PT Sanbe Farma	A7
PT Tempo Scan Pacific Tbk	A8
PT Bernofarm Pharmaceutical	A9
PT Soho Global Health Tbk	A10

Tabel 2. Criteria

Criteria	Cost/Benefit
Demand Frequency (C1)	Benefit
Lead Time (C2)	Cost
Remaining Shelf Life (C3)	Benefit
Average Purchase Price (C4)	Cost
Profit Margin (C5)	Benefit

The criteria weights in this study were determined through interviews with the pharmacy as the decision-maker in pharmaceutical inventory management. The obtained weights were then normal-

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol XII No 3, June 2026, hlm. 423 – 428 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v12i3.4443
Available online at https://jurnal.stmikroyal.ac.id/index.php/jurteksi

ized so that the total equals 1, according to the requirements of the Weighted Product (WP) method. These normalized weights are used to calculate the preference values of each alternative. The normalization process is performed using the following formula:

$$Wj = \frac{Wj}{\Sigma Wj}$$

The results are presented as follows:

$$W1 = \frac{25}{(25+20+20+15+20)} = \frac{25}{100} = 0{,}25$$

$$W2 = \frac{20}{(25+20+20+15+20)} = \frac{20}{100} = 0{,}20$$

$$W3 = \frac{20}{(25+20+20+15+20)} = \frac{20}{100} = 0{,}20$$

$$W4 = \frac{15}{(25+20+20+15+20)} = \frac{15}{100} = 0{,}15$$

$$W5 = \frac{20}{(25+20+20+15+20)} = \frac{20}{100} = 0{,}20$$

Tabel 3. Weight Normalization

Weight	Result
C1	0,25
C2	0,2
C3	0,2
C4	0,15
C5	0,2
Result =	1

Next, a score is assigned to each alternative for every criterion.

Tabel 4. Alternative Values

Alternative	C1	C2	C3	C4	C5
A1	5	3	36	9.900	1.500
A2	5	2	48	10.200	1.300
A3	4	3	36	9.700	1.800
A4	3	4	36	10.300	1.200
A5	4	3	36	9.850	1.400
A6	3	4	24	9.800	1.350
A7	4	3	36	9.750	1.600
A8	5	2	24	10.100	1.250
A9	3	4	48	9.650	1.700
A10	2	3	36	9.700	1.900

The calculation of the S vector value is:

Tabel 5. Result of S Vector

Alternatif	S
A1	2,669634
A2	2,966767
A3	2,626576
A4	2,108820
A5	2,492077
A6	2,005827
A7	2,563448
A8	2,566330
A9	2,418395
A10	2,232691
Result =	24,650565

After obtaining the S value for each alternative, next step calculate vector value

Table 6 Vector Result

Alternative	V	Rangking
A1	0,108299	2
A2	0,120353	1
A3	0,106552	3
A4	0,085549	9
A5	0,101096	6
A6	0,081370	10
A7	0,103991	5
A8	0,104108	4
A9	0,098107	7
A10	0,090574	8

JURTEKSI (Jurnal Teknologi dan Sistem Informasi) ISSN 2407-1811 (Print)
Vol XII No 3, June 2026, hlm. 423 – 428 ISSN 2550-0201 (Online)
DOI: https://doi.org/10.33330/jurteksi.v12i3.4443
Available online at https://jurnal.stmikroyal.ac.id/index.php/jurteksi

Based on the results the ranking can be performed using the V values, with the highest value obtained as shown below:

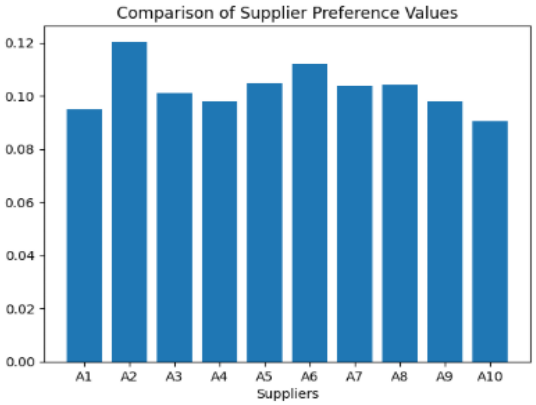

Image 2. Chart of Result

From the ranking results obtained using the Weighted Product method, the highest value is 0.120353, which corresponds to alternative A2, namely **PT Kimia Farma Tbk.**

To support the reported results, the following figures present the system information view of the developed web-based decision support system. The interface demonstrates how supplier assessment data are entered and how the WP method is executed to generate the ranking and recommendation. The dashboard view summarizes the number of suppliers and criteria and displays the final recommendation generated by the WP results.

Image 3. Dashboard Analysis

The assessment matrix interface is used to input each supplier's evaluation scores for criteria C1–C5, forming the decision matrix for the subsequent WP computation.

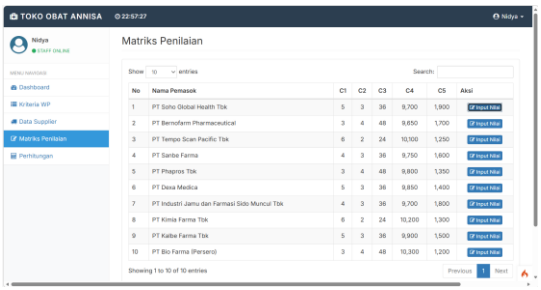

Image 4. Assessment matrix input interface.

The WP computation page presents the processing stage, including weight normalization (with cost-type criteria treated using negative exponents), S-vector calculation, and V-vector computation to obtain the final preference values and supplier ranking.

Image 5. Weighted Product (WP) computation results.

CONCLUSION

The findings of this study demonstrate that PT Kimia Farma achieves the highest preference value based on the Weighted Product (WP) method, indicating its suitability as the most favorable supplier among the evaluated alternatives. This result is influenced by its consistent performance across key decision

criteria, such as demand frequency, delivery lead time, purchase price, remaining shelf life, and profit margin.From a practical perspective, these results suggest that the pharmacy owner should prioritize PT Kimia Farma as the primary supplier for fast-moving pharmaceutical products. At the same time, suppliers with relatively competitive preference values can be utilized as secondary options to ensure supply reliability and reduce the risk of dependency on a single supplier.

The integration of the WP method into a Decision Support System facilitates an objective and systematic evaluation process by consolidating multiple criteria into a single assessment framework. Consequently, the resulting supplier ranking serves as a data-driven reference that can support more effective procurement decisions, enhance operational efficiency, and promote sustainable inventory management at Annisa Drugstore.

BIBLIOGRAPHY

[1] V. P. Sabandar, "Sistem Pendukung Keputusan Penentuan Produk Terbaik Menggunakan Weighted Product Method," Vol. 1, No. January, Pp. 58–68, 2023.

[2] N. Renaldo, D. Jollyta, L. Fransisca, And M. Rosyadi, "Pengaruh Fungsi Sistem Intelijen Bisnis Terhadap Manfaat Sistem Pendukung Keputusan Dan Organisasi," Vol. 6, No. 3, 2022.

[3] D. P. Putro, P. E. Suryani, And S. Amri, "Komparasi Ahp , Saw , Topsis , Vikor , Dan Mabac Pada," Vol. 23, No. 1, Pp. 1–11, 2025.

[4] A. Rafiqi, A. Rifqi, And R. Tamara Aldisa, "Implementasi Sistem Pendukung Keputusan Dalam Pemilihan Vendor It Menerapkan Metode Weighted Product (Wp)," *Media Online*, Vol. 4, No. 1, Pp. 1–7, 2023, [Online]. Available: Https://Djournals.Com/Resolusi

[5] A. A. Gaffar, S. V. Susilo, And N. Nurmalawaty, "Implementasi Model Diagnostik Tes Kesulitan Siswa Pasca Pandemi Covid-19," Vol. 3, No. September, Pp. 119–126, 2024.

[6] S. Komputer, D. M. Sela, And A. H. Hasugian, "Metode Simple Additive Weighting Untuk Menentukan Jumlah Persedian Stok Obat Tbc Pada Puskesmas Bagan Asahan," Vol. 19, No. 2, Pp. 200–215, 2024.

[7] I. Technology, "Implementation Of Weighted Product Method In Determining Selection The Best Music," Vol. 20, No. 1, Pp. 31–40, 2023.

[8] S. M. Patanduk And A. S. Purnomo, "Sistem Pendukung Keputusan Menentukan Kelayakan Kenaikan Gaji Karyawan Menggunakan Metode Weighted Product (Wp) (Studi Kasus : Gading Mas Yogyakarta)," Vol. 5, No. 2, 2025.

[9] M. Dmbok, D. A. N. Cobit, And D. I. Bps, "Pengukuran Tingkat Kapabilitas Sistem Pengolahan Data Survei Pada Manajamen Kinerja Dan Manajemen Data Operasi Capability Level Measurement Of Survey Data Processing System In Data Operations And Performance Management Using Dmbok And Cobit2019 In Bps : A Case Study IN singlestatistic Indonesia," vol. 10, no. 3, pp. 573–582, 2023, doi: 10.25126/jtiik.2023106533.

[10] P. L. Jatika, D. Mardian, A. S. Puspaningrum, A. Hasibuan, and M. Hermanto, "Sistem Pendukung Keputusan Penentuan Siswa Berprestasi Menggunakan Metode Weight Product (WP)," vol. 4, pp. 158–166, 2023.