

Analysis Of Best-Selling Accessories In The Wiwid Collection Using The Moora Method

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ABSTRACT

Medication logistics management is a critical aspect of supporting healthcare. Wiwid Collection is a business selling various types of accessories located in Perk Sei Balai (Lolotan), Dusun 3 Sukajadi, Batu Bara Regency, North Sumatra. Wiwid Collection faces various challenges in determining best-selling accessories that are most in demand by consumers. Difficulties in identifying superior products persist because product selection is based on guesswork and not based on structured sales data analysis. This often leads to inaccurate decisions regarding stock management and marketing strategies. To address these issues, a Decision Support System (DSS) using the MOORA (Multi-Objective Optimization on the Basis of Ratio Analysis) method is needed, capable of processing accessory sales data in a structured and systematic manner based on assessment criteria including stock, sales quantity, price, and purchase time. The purpose of this research is to design and build a computerized system capable of assisting decision-making in determining best-selling accessories at Wiwid Collection. The Multi-Objective Optimization by Ratio Analysis (MOORA) method is one of the methods used in Decision Support Systems (DSS). The research method used is quantitative, a research method that prioritizes the collection and analysis of quantitative data in the form of numbers, statistics, and mathematical formulas. Based on the research results, the alternative preferences for best-selling accessories are ranked 1 (Long Socks), 2 (Bead Bracelets), 3 (Chinese Rubber), 4 (Star Clips), and 5 (Rings).

INTRODUCTION

The continuous advancement of information technology has had a significant impact on various business sectors, particularly on micro, small, and medium-sized enterprises (MSMEs) in the trade sector (Erni Rouza et al., 2023). Information technology not only serves as a tool to support administrative activities but has also become a strategic factor in enhancing business competitiveness through more accurate, faster, and integrated data management (Y. W. S. Putra & Prayitno, 2021). With information technology, business actors can systematically process various important information, such as sales data, inventory data, and consumer behavior, thereby generating valuable insights to support decision-making (Kaunan et al., 2023).

In the context of the accessories retail business, the use of information technology is becoming increasingly important given the nature of accessories, which come in a wide variety of types, models, and prices, and have varying levels of demand (Sasmoko & Supriadi, 2024). Accessories such as bracelets, necklaces, earrings, rings, and various other fashion jewelry tend to experience changing trends in a relatively short period of time, thus requiring proper sales data management so that businesses can adjust product availability to market needs. Without the support of information technology, accessory data management is likely to be done manually, which is prone to recording errors and information delays. This information is crucial for identifying best-selling products, devising promotional strategies, and planning inventory procurement more effectively (Samiah et al., 2023).

The relationship between inventory and best-selling products is crucial in business management, as products classified as best sellers typically have high sales volumes, thereby requiring larger and more carefully managed inventory levels (Iqbal et al., 2022). Conversely, if inventory is not adjusted to sales levels, imbalances may occur, such as stock shortages for popular products or stockpiling of less popular items (Ginting & Puspasari, 2025). Therefore, an analysis capable of linking inventory and sales data is needed to support more accurate decision-making (Dwi Octaviani et al., 2023). Wiwid Collection is a business engaged in the sale of various types of accessories located in Perk Sei Balai (Lolotan), Dusun 3 Sukajadi, Batu Bara Regency, North Sumatra, and owned by Widyastuti.

In its day-to-day operations, Wiwid Collection faces various challenges in determining which best-selling accessories are most in demand among consumers. The company continues to struggle with identifying top-selling products because decisions are made based on guesswork rather than structured sales data analysis, resulting in suboptimal decisions regarding inventory management and marketing strategies. This situation results in high-selling products not always being prioritized, while products with low demand are still stocked in large quantities. Additionally,



decision-making processes not supported by systematic calculation methods lead to decisions that tend to be subjective. On the other hand, this issue stems from the lack of a computerized system based on information technology, so sales data is not yet integrated and has not been optimally utilized as a basis for analysis in determining the best-selling accessories at Wiwid Collection.

To address this issue, it is necessary to implement a Decision Support System (DSS) using the MOORA (Multi-Objective Optimization on the Basis of Ratio Analysis) method, which is capable of processing accessory sales data in a structured and systematic manner based on evaluation criteria that include inventory, sales volume, price, and purchase time (Hamang et al., 2023). The application of the MOORA method allows each type of accessory to be evaluated objectively by considering benefit- and cost-based criteria, thereby producing accurate optimization values and product rankings (Eko Syaputra et al., 2024). With this system, the owner of Wiwid Collection is expected to accurately identify best-selling accessories, improve decision-making accuracy, and optimize inventory management and marketing strategies through the use of information technology (El Faritsi et al., 2022).

A decision support system is a computer-aided decision-making process that assists decision-makers in solving various unstructured problems using specific data (Amaliah & Suprianto, 2021). Decision support systems employ an approach that helps solve problems with the aid of data and modeling (Jannah et al., 2024). In this process, the system can generate several decision options to consider, thereby making it easier for decision-makers to make effective choices (Manajemen et al., 2024). DSS plays a role in filtering and analyzing large volumes of data, as well as gathering comprehensive information that can be utilized to solve problems and support the decision-making process (A. M. Putra et al., 2022).

The MOORA method (Multi-Objective Optimization on the Basis of Ratio Analysis) is a decision support system technique used to solve multi-criteria problems by considering several interrelated objectives. This method works by comparing the value of each alternative against each criterion, then calculating a ratio based on the normalization of those values. Each criterion can be categorized as a benefit or a cost, where a higher benefit value indicates better performance, while a lower cost value indicates higher efficiency. The final result of the MOORA method is a ranking of alternatives based on the final value (Y_i), calculated from the difference between the sum of the benefit and cost values. The MOORA method was introduced by Brauers and Zavadkas. This relatively new method was used by Brauers in a multi-criteria decision-making process. The MOORA method offers a high degree of flexibility and ease of understanding in separating the subjective aspects of an evaluation process into decision-making criteria with multiple decision-making attributes.

The Multi-Objective Optimization by Ratio Analysis (MOORA) method is one of the methods used in Decision Support Systems (DSS). Multi-Objective Optimization by Ratio Analysis (MOORA) is known as the weighted sum method. It is called this because, fundamentally, MOORA performs a weighted sum for all attributes across every alternative. The core concept of the MOORA method is to calculate the weighted sum of performance ratings for each alternative across all attributes. The Multi-Objective Optimization by Ratio Analysis (MOORA) method requires the normalization of the decision matrix (X) to a scale that can be compared with all existing alternative ratings.

As the volume of sales data increases, there is a need for a system capable of processing that data in a structured and systematic manner. Information technology, particularly in the form of Decision Support Systems (DSS), can be utilized to help business owners analyze sales data based on specific criteria, thereby leading to more accurate and objective decisions.

METHOD

The method used in this research is a quantitative approach aimed at analyzing accessory sales data systematically to support decision-making. This study focuses on the application of a Decision Support System (DSS) using the MOORA (Multi-Objective Optimization on the Basis of Ratio Analysis) method to determine the best-selling accessories at Wiwid Collection. The quantitative method is chosen because it allows the processing of numerical data through structured calculations, resulting in objective and measurable outcomes. The research process is carried out through several stages, starting from problem identification, data collection, data analysis, system design, system development, system testing, and system implementation. These stages are designed to ensure that the system built can function effectively and produce accurate recommendations.

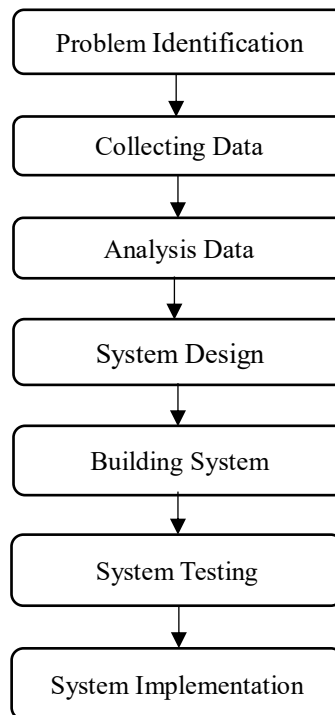


Figure 1. Research Stages

This research has the following stages:

Problem Identification

The problem identified in this study is the difficulty in identifying best-selling accessories, as product selection is still based on guesswork, resulting in suboptimal inventory and marketing decisions. Furthermore, decision-making errors frequently occur due to the lack of a structured calculation method, leading to less objective outcomes. Another issue is the absence of a computerized system to assist in decision-making regarding best-selling products.

Collecting Data

At this stage, data and information were collected to gain a better understanding of the system under study. The data collected from Wiwid Collection consisted of information on best-selling products. The author visited Wiwid Collection in person and conducted an interview with the owner regarding the data collection process.

Analysis Data

The data analysis in this study used the MOORA method to help determine the priority of best-selling products in the Wiwid Collection. The MOORA method was chosen because it provides a more objective assessment through the weighting and calculation of preference values for each product type. The data obtained was then processed by establishing evaluation criteria such as inventory, sales volume, price, and time of purchase.

System Design

System design is a blueprint of a system created to address the problems faced by an organization following a preliminary analysis. The management system at Wiwid Collection will be designed using the PHP programming language, a MySQL database, Information System Flowcharts (ISF), flowcharts, and Entity-Relationship Diagrams (ERDs); the user interface will be designed using Microsoft Visio; and Unified Modeling Language (UML) diagrams will be designed using Visual Paradigm.

Building System

This stage involves designing the system to be developed. The system is implemented using the PHP programming language, a MySQL database, Information System Flow (ISF), and the Unified Modeling Language (UML).

System Testing

Once the design is complete, the program will first be tested to determine whether it meets its intended objectives. The decision support system for prioritizing best-selling products at Wiwid Collection, which has been fully designed, will be tested using black-box testing. This is useful for determining whether the system that has been developed meets the author's expectations.

System Implementation

Programs that are ready will be implemented at this stage, with the criteria being that they are user-friendly and easy for users to understand. The best-seller prioritization system, which has completed testing, can now be implemented in Wiwid Collection and utilized to its full potential.

RESULT

Data Analysis

The data on accessories in the Wiwid Collection for the 2025–2026 period can be found in Table 1.

Table 1. Data Accessories at Wiwid Collection Period 2025-2026

No	Name	Stock	Sell	Price	Year
1	Anting	38	25	15000	2025
2	Bando Anak	12	10	25000	2025
3	Bando Bulu	26	12	15000	2026
4	Bando Premi	33	19	10000	2025
5	Brus Baju	35	30	15000	2025
6	Brus jilbab Besar	20	13	15000	2025
7	Brus Jilbab Mini	36	20	5000	2025
8	Cincin	50	35	10000	2025
9	Gelang Manik	36	35	5000	2025
10	Hena tangan	20	18	8000	2025
...		...	...		...
18	Jepit Rambut Dewasa	24	18	7000	2026

Table 1 presents the dataset of accessories sold at Wiwid Collection during the 2025–2026 period, which serves as the basis for analysis using the MOORA method. The table consists of 18 alternatives representing different types of accessories, each evaluated based on four criteria: stock, sales quantity, price, and year of sale.

The stock criterion indicates the number of items available for each accessory, reflecting inventory levels. The sales (sell) criterion represents the number of units sold, which is a key indicator in determining best-selling products. The price criterion shows the selling price of each accessory, which is considered as a cost attribute in the MOORA calculation. Meanwhile, the year criterion provides temporal information that can influence product demand trends.

From the table, it can be observed that several products such as Cincin, Gelang Manik, and Jepit Bintang have relatively high sales values compared to others, indicating strong market demand. On the other hand, some items have lower sales despite having sufficient stock, which may suggest lower consumer interest. These variations in data highlight the need for a systematic decision-making approach to objectively determine the best-selling accessories.

Therefore, the data in Table 1 will be processed using the MOORA method by normalizing the values and calculating preference scores to produce a ranking of accessories based on their performance across all criteria.

System Design

In general, the system to be designed is illustrated by the Use Case Diagram shown in Figure 2.

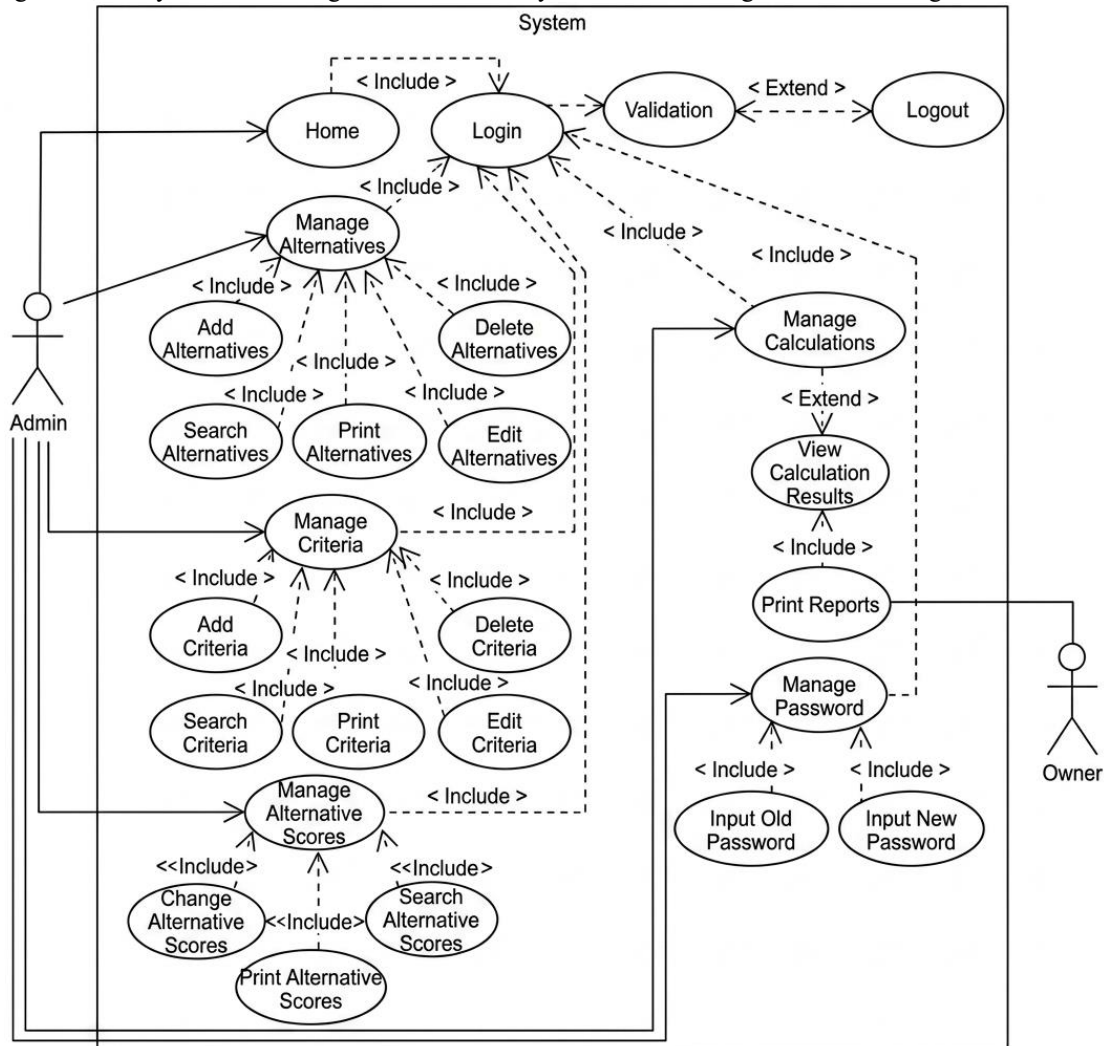


Figure 2. Use Case Diagram

Figure 2 illustrates the overall interaction between the user (admin) and the system. It shows the main functionalities of the decision support system, including managing data, processing calculations, and generating ranking results. This diagram provides a general overview of how the system operates.

Implementation

The following are the results of the Multi-Objective Optimization based on Ratio Analysis (MOORA) decision support system program, which was used to analyze best-selling accessories. This system features an easy-to-understand interface, and its purpose is to assist Wiwid Collection in analyzing best-selling accessories and making more accurate decisions regarding their best-selling accessory strategy.

- Login Page

Figure 3 shows the login interface used by users to access the system. The admin is required to enter a valid username and password to ensure system security before accessing the main features. The login page is used to manage user access rights for logging into the system. Users with the username: admin and password: admin.

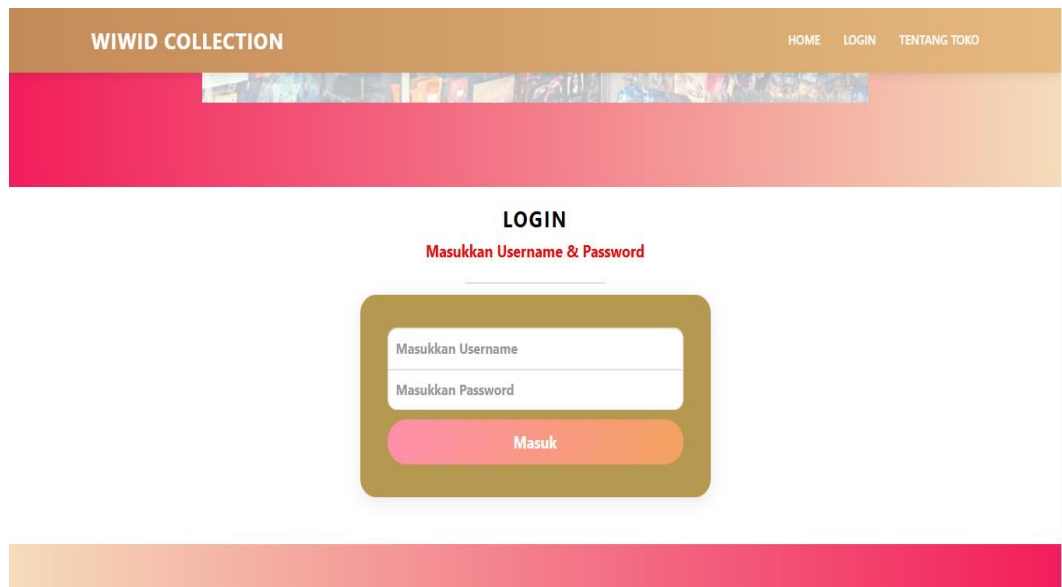


Figure 3. Login Page

- Home Page

Figure 4 presents the main dashboard of the system after successful login. This page serves as the central navigation point, allowing users to access various system features such as data management and analysis.

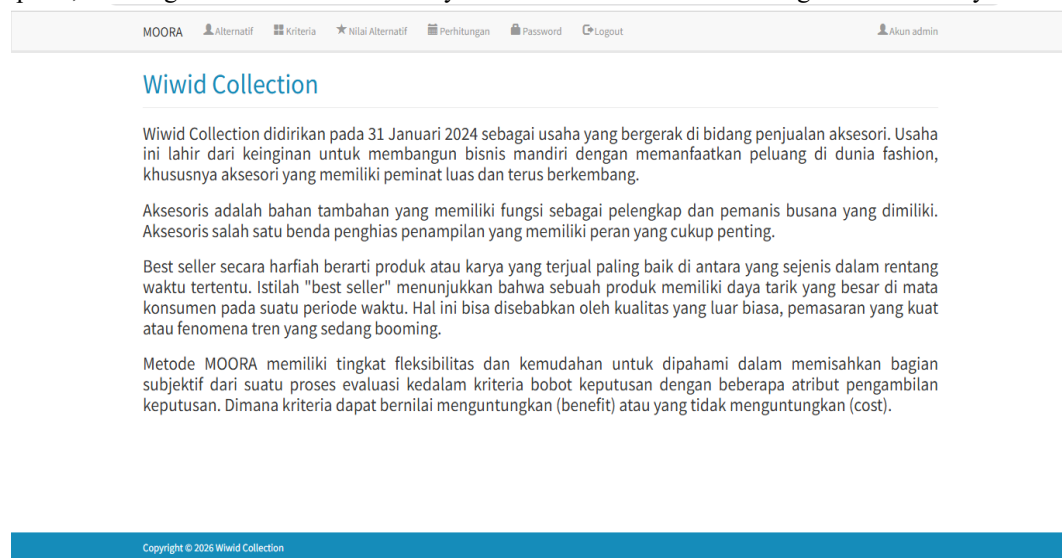


Figure 4. Home Page

- Data Alternative

Figure 5 displays the alternative data page, which contains a list of accessory products. On this page, users can input, edit, and manage product data that will be used in the decision-making process.

MOORA Alternatif Kriteria Nilai Alternatif Perhitungan Password Logout Akun admin				
Alternatif				
Pencarian... REFRESH TAMBAH CETAK				
No	Kode	Nama Alternatif	Keterangan	Aksi
1	A01	Gelang Manik		 
2	A02	Bando Premi		 
3	A03	Bando Bulu		 
4	A04	Ikat Rambut ubur-ubur		 
5	A05	Kacamata Anak		 
6	A06	Kacamata Dewasa		 
7	A07	Brus Jilbab Mini		 
8	A08	Brus jilbab Besar		 
9	A09	Jedai Kamboja Besar		 
10	A10	Jepit Rambut Anak		 
11	A11	Mahkota		 

Figure 5. Data Alternative

- Data Criteria

Figure 6 shows the criteria data page used to define the evaluation criteria in the system. These criteria, such as stock, sales, price, and year, are essential for calculating the ranking using the MOORA method.

MOORA Alternatif Kriteria Nilai Alternatif Perhitungan Password Logout Akun admin				
Kriteria				
Pencarian... REFRESH TAMBAH CETAK				
Kode	Nama Kriteria	Atribut	Bobot	Aksi
C01	Stok	cost	0.2	 
C02	Penjualan	benefit	0.4	 
C03	Harga	cost	0.25	 
C04	Waktu Pembelian	cost	0.15	 

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Figure 6. Data Criteria

- Calculation Page

Figure 7 illustrates the calculation process page, where the system performs MOORA computations. This includes normalization and preference value calculations for each alternative based on the defined criteria.

MOORA	Alternatif	Kriteria	★ Nilai Alternatif	Perhitungan	Password	Logout	Akun admin
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Perhitungan

Hasil Analisa					
Kode	Nama	Stok	Penjualan	Harga	Waktu Pembelian
A01	Gelang Manik	3	3	1	4
A02	Bando Premi	3	2	2	4
A03	Bando Bulu	2	1	3	5
A04	Ikat Rambut ubur-ubur	1	1	3	5
A05	Kacamata Anak	3	2	2	5
A06	Kacamata Dewasa	3	2	3	5
A07	Brus Jilbab Mini	3	2	1	4
A08	Brus jilbab Besar	2	1	3	4
A09	Jedai Kamboja Besar	3	2	2	5
A10	Jepit Rambut Anak	5	2	1	4
A11	Mahkota	1	1	1	5

Figure 7. Calculation Page

- Rank Result

Figure 8 presents the ranking results generated by the system. It shows the ordered list of accessories based on their final preference values, indicating the best-selling products.

Perangkingan					
Kode	Nama	Benefit (Max)	Cost (Min)	Yi (Benefit - Cost)	Rank
A31	Kaos Kaki Panjang	0.16	-0.137	0.023	1
A01	Gelang Manik	0.096	-0.079	0.017	2
A21	Karet Cina	0.096	-0.079	0.017	3
A19	Jepit Bintang	0.096	-0.079	0.017	4
A22	Cincin	0.096	-0.095	0.001	5
A12	Jedai Mini	0.064	-0.079	-0.015	6
A07	Brus Jilbab Mini	0.064	-0.079	-0.015	7
A20	Jedai Kamboja Mini	0.064	-0.079	-0.015	8
A24	Brus Baju	0.096	-0.111	-0.015	9
A29	Hena Tangan	0.064	-0.082	-0.018	10
A17	Jepit Rambut Dewasa	0.064	-0.088	-0.025	11
A11	Mahkota	0.032	-0.06	-0.028	12
A02	Bando Premi	0.064	-0.095	-0.031	13
A32	Kaos Kaki Pendek	0.064	-0.095	-0.031	14
A18	Tali Pinggang	0.096	-0.127	-0.031	15

Figure 8. Rank Result

- Rank Report

Figure 9 displays the ranking report page, which provides a summary of the final results. This report can be used by decision-makers to support strategic decisions regarding inventory and sales.

Perangkingan

Kode	Nama	Benefit	Cost	Benefit - Cost	Rank	Keterangan
A31	Kaos Kaki Panjang	0.023	0	0.023	1	Best Seller
A01	Gelang Manik	0.0168	0	0.0168	2	Best Seller
A21	Karet Cina	0.0168	0	0.0168	3	Best Seller
A19	Jepit Bintang	0.0168	0	0.0168	4	Best Seller
A22	Cincin	0.0007	0	0.0007	5	Best Seller
A12	Jedai Mini	-0.0152	0	-0.0152	6	Belum Best Seller
A24	Brus Baju	-0.0153	0	-0.0153	7	Belum Best Seller
A07	Brus Jilbab Mini	-0.0152	0	-0.0152	8	Belum Best Seller
A20	Jedai Kamboja Mini	-0.0152	0	-0.0152	9	Belum Best Seller
A29	Hena Tangan	-0.0184	0	-0.0184	10	Belum Best Seller
A17	Jepit Rambut Dewasa	-0.0246	0	-0.0246	11	Belum Best Seller
A11	Mahkota	-0.0277	0	-0.0277	12	Belum Best Seller
A02	Bando Premi	-0.0312	0	-0.0312	13	Belum Best Seller
A18	Tali Pinggang	-0.0314	0	-0.0314	14	Belum Best Seller
A32	Kaos Kaki Pendek	-0.0312	0	-0.0312	15	Belum Best Seller
A05	Kacamata Anak	-0.0374	0	-0.0374	16	Belum Best Seller
A14	Roll Rambut	-0.0374	0	-0.0374	17	Belum Best Seller
A09	Jedai Kamboja Besar	-0.0374	0	-0.0374	18	Belum Best Seller
A30	Sarung Tangan	-0.0376	0	-0.0376	19	Belum Best Seller
A10	Jepit Rambut Anak	-0.0407	0	-0.0407	20	Belum Best Seller
A25	Anting	-0.0472	0	-0.0472	21	Belum Best Seller
A26	Topi	-0.0474	0	-0.0474	22	Belum Best Seller
A06	Kacamata Dewasa	-0.0534	0	-0.0534	23	Belum Best Seller
A28	Scarf Leher	-0.0536	0	-0.0536	24	Belum Best Seller
A13	Pita Anggrek	-0.0565	0	-0.0565	25	Belum Best Seller
A04	Ikatan Rambut ubur-ubur	-0.0598	0	-0.0598	26	Belum Best Seller
A16	Kalung	-0.0633	0	-0.0633	27	Belum Best Seller
A08	Brus jilbab Besar	-0.0664	0	-0.0664	28	Belum Best Seller
A27	Tas	-0.0665	0	-0.0665	29	Belum Best Seller
A23	Bando Anak	-0.0696	0	-0.0696	30	Belum Best Seller
A03	Bando Bulu	-0.0725	0	-0.0725	31	Belum Best Seller
A15	Jam Tangan	-0.0985	0	-0.0985	32	Belum Best Seller

Catatan: Berdasarkan hasil analisis menggunakan metode MOORA pada penentuan produk "Best Seller" di Wiwid Collection, produk dengan nilai tertinggi akan diprioritaskan. Produk yang berada pada peringkat 1 sampai dengan peringkat 5 ditetapkan sebagai produk "Best Seller" oleh pemilik Wiwid Collection.

Figure 9. Rank Report

Analysis MOORA

The data used is presented in Table 1. The first step involved weighting based on four criteria: Inventory (weight 0.20), Sales (weight 0.40), Price (weight 0.25), and Purchase Time (weight 0.15). Next, the matrix was normalized using the following equation:

$$X_{ij}^* = X_{ij} / \sum_{i=1}^m X_{ij} \quad (1)$$

Therefore, for Criterion C1 = Inventory

$u_{1,1} = \Rightarrow$ Gelang Manik

$$= \frac{3}{\sqrt{9+9+4+1+9+9+9+4+9+25+1+9+4+9+9+9+9+9+1}} = 0,192$$

$$u_{2,1} \text{ Bando Premi} = \frac{3}{\sqrt{9+9+4+1+9+9+9+4+9+25+1+9+4+9+9+9+9+9+1}} = 0,192$$

$$u_{3,1} \text{ Bando Bulu} = \frac{2}{\sqrt{9+9+4+1+9+9+9+4+9+25+1+9+4+9+9+9+9+9+1}} = 0,128$$

$u_{4,1}$ *Slkat Rambut Ubur – Ubur*

$$= \frac{1}{\sqrt{9+9+4+1+9+9+9+4+9+25+1+9+4+9+9+9+9+1}} = 0,064$$

$$u_{5,1} \text{ Kacamata Anak} = \frac{3}{\sqrt{9+9+4+1+9+9+9+4+9+25+1+9+4+9+9+9+9+1}} = 0,192$$

sampai dengan alternatif 32.

After obtaining the normalized root results, the weighted optimization values can be seen in the following calculation:

For criteria C1 = stock with weight 0,20 on the atribut cost:

1. Alternative: stock weight * square root of normalization
Gelang Manik: $0,20 * 0,192 = 0,038$
2. Alternative: stock weight * square root of normalization
Bando Premi: $0,20 * 0,192 = 0,038$
3. Alternative: stock weight * square root of normalization
Bando Bulu: $0,20 * 0,128 = 0,026$
4. Alternative: stock weight * square root of normalization
Ikat Rambut Ubur-Ubur: $0,20 * 0,323 = 0,013$
5. Alternative: stock weight * square root of normalization
Kacamata Anak: $0,20 * 0,192 = 0,038$ until alternative 32.

After obtaining the total results of the optimization values, the ranking of benefits and costs for the Wiwid Collection can be seen. The results of the MOORA method calculation, which identified the best-selling accessories, were narrowed down to the top 5 based on a ranking from 1 to 5. Thus, the calculation of preferences for the best-selling accessories yields the following rankings: Rank 1 (Long Socks), Rank 2 (Beaded Bracelet), Rank 3 (Chinese Hair Tie), Rank 4 (Star Hair Clip), and Rank 5 (Ring).

DISCUSSION

The implementation of a Decision Support System (DSS) using the MOORA method at Wiwid Collection provides significant improvements compared to the previous manual approach. Before the system was implemented, the process of determining best-selling accessories was carried out subjectively, relying on intuition and estimation. This condition often resulted in inaccurate decisions, such as overstocking less popular items and insufficient stock for high-demand products. In addition, the absence of structured data processing made it difficult for the business owner to identify sales patterns and prioritize products effectively.

After the implementation of the system, the decision-making process becomes more objective, systematic, and data-driven. The MOORA method enables the evaluation of each accessory based on multiple criteria, including stock, sales quantity, price, and purchase time. Through normalization and preference value calculations, the system produces a ranking of products that accurately reflects their performance. As a result, the identification of best-selling accessories becomes more precise and consistent.

Furthermore, the system improves efficiency in data processing and reduces the risk of human error in calculations. The availability of ranking results also supports better inventory management and marketing strategies, as business owners can focus on promoting high-performing products while minimizing losses from slow-moving items. Overall, the implementation of the DSS using the MOORA method successfully addresses the initial problems and enhances the quality of decision-making at Wiwid Collection.

CONCLUSION

Based on the results of the research conducted at Wiwid Collection, several conclusions can be drawn: Based on the research results, the process of identifying best-selling accessories at Wiwid Collection can be carried out more accurately using the MOORA method. The evaluation was conducted based on predetermined criteria, resulting in objective preference scores. The results of the MOORA method calculations show that best-selling accessories were selected into 5 alternatives based on a ranking from 1 to 5. Thus, the calculated preference rankings for the best-selling accessories are: Rank 1 (Long Socks), Rank 2 (Beaded Bracelet), Rank 3 (Chinese Hair Tie), Rank 4 (Star Hair Clip), and Rank 5 (Ring). Consequently, decisions regarding inventory and marketing are no longer based on estimates but on systematic data and calculations. The computerized system, which has been designed and developed, assists in the



decision-making process for determining best-selling accessories. This application, which is now operating optimally, makes it easier for users to manage data, perform automatic calculations, and display product ranking results quickly and accurately. Furthermore, the implementation of the MOORA method within the system reduces errors in manual calculations and enhances objectivity in decision-making. With a structured calculation process, the results obtained are more consistent and transparent.

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