

Decision Support System

Development of a Decision Support System to Determine Best-Selling Menu Canteen Employees of the Bank Indonesia Representative Office in North Sumatra Province using the Topsis Method

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A B S T R A C T

The availability of accurate sales information is essential for supporting managerial decision-making in institutional food services. At the Bank Indonesia Representative Office in North Sumatra Province, determining the best-selling menu for employee canteen services is still largely based on manual evaluation, which may lead to inefficiencies and subjective judgments. This study aims to develop a Decision Support System (DSS) to identify the best-selling canteen menu using the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method. The system evaluates menu alternatives based on multiple criteria, including sales volume, price, menu availability, and employee preferences. Data were collected from historical sales records and questionnaires distributed to canteen employees. The TOPSIS method was applied to rank menu alternatives by calculating their relative closeness to the ideal positive and ideal negative solutions. The DSS was implemented as a computerized system to facilitate data processing, ranking, and visualization of decision results. The results show that the proposed system is able to objectively determine the best-selling menu and provide consistent rankings compared to conventional methods. The developed DSS improves accuracy, efficiency, and transparency in menu evaluation, thereby supporting better planning and inventory management for the employee canteen. This study demonstrates that integrating multi-criteria decision-making methods into a DSS can effectively enhance decision quality in institutional food service management.

INTRODUCTION

Office canteens play a crucial role in providing food for employees. They serve not only as a place to eat but also as a platform for fostering social interaction among employees. The menu offered in canteens must meet both the nutritional needs and preferences of employees, making it crucial to identify the most popular or "best-selling" menu items. By identifying these best-selling items, canteen managers can focus on providing options that meet employee preferences, which in turn can increase employee satisfaction and productivity [1,2,3].

However, in canteens, food management often faces challenges, such as the one at the Bank Indonesia North Sumatra canteen, causing confusion for employees and customers in making their choices. Furthermore, unpopular menu items can lead to food waste, which is not only financially detrimental but also negatively impacts the environment. Conventional canteen service creates inconvenience and inefficiency. Therefore, a system is needed that can determine best-selling menu items based on employee preferences to support more accurate and efficient decisions [4,5].

An effective solution to this problem is the implementation of a Decision Support System (DSS). By using the right method, a DSS can provide objective and accurate recommendations. One popular method in DSS is the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS). This method allows comparison of various menu alternatives based on predetermined criteria, thus helping canteen managers determine the menu that is most popular with employees. Therefore, a system is needed that can identify best-selling menus based on employee preferences to support more accurate and efficient decision-making. Used the TOPSIS method to determine a food menu for toddlers suffering from malnutrition, considering certain criteria to produce optimal menu recommendations [6,7]. In addition, research also applied the TOPSIS method in a decision support system for menu selection for obese patients, which assisted in determining menus that meet the patient's nutritional needs. Thus, the application of the TOPSIS method in the context of an institutional canteen is expected to help identify best-selling menus, reduce food waste, and improve the overall operational efficiency of the canteen [8,9,10].

METHODS

This study implements the Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method as the main foundation in developing a decision support system (DSS). This DSS is designed to identify food menu preferences in the canteen of the Bank Indonesia Representative Office in North Sumatra Province. TOPSIS was selected based on its ability to rank decision alternatives based on.

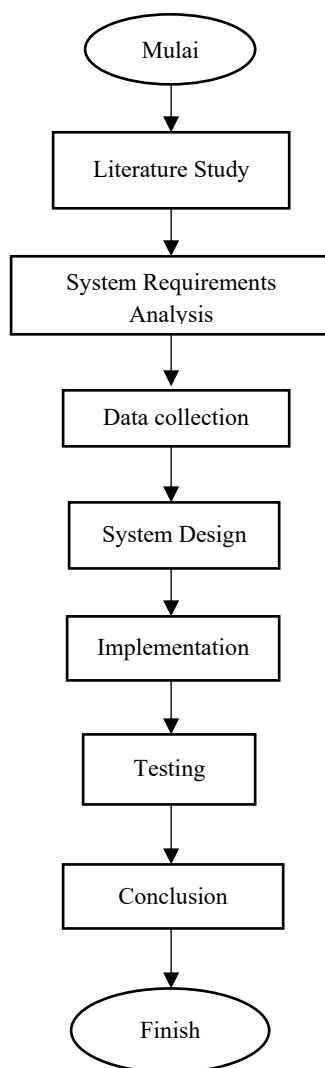


Figure 1. Research Flowchart

The degree of proximity to the positive ideal solution and the degree of separation from the negative ideal solution. Explanation of each stage in the research flowchart:

1. **Beginning:** The initial stage marks the beginning of the research process. The researcher determines the topic, formulates the problem, and establishes the research objectives.
2. **Literature study:** A literature study is conducted by reviewing various sources such as journals, books, and relevant previous research. This stage is crucial for strengthening the theoretical foundation and methods used, such as Decision Support Systems (DSS) and the TOPSIS method.
3. **System Requirements Analysis:** In this stage, researchers identify user needs and system specifications, both functionally and non-functionally. The goal is to understand what features the DSS system to be developed should have.
4. **Data Collection:** Data is collected as a basis for processing and decision-making. This can include questionnaire data, historical food sales data, or interviews with the canteen staff and employees.
5. **System Design:** The design phase is carried out to develop a blueprint for the system to be built, including the user interface (UI) design, system flowcharts, and database structure.
6. **Implementation:** Implementation is the process of developing a DSS system in the form of a real application, based on the design results. In this stage, researchers will write program code, build a database, and apply the TOPSIS method to the system.
7. **Testing:** After implementation is complete, testing is conducted to ensure the system performs as expected. Testing can be done using data validity and reliability testing methods, as well as user satisfaction testing.
8. **Conclusion:** Conclusions are drawn based on the system testing results and the extent to which the system can help determine best-selling menu items. This stage also includes suggestions for future system development.
9. **Finished:** The final stage of the research process marks that all research activities have been completed.

RESULTS AND DISCUSSION

The results of the Decision Support System Development for Determining the Best-Selling Menu for Employees at the Bank Indonesia Representative Office in North Sumatra Province Using the TOPSIS Method are as follows:

1. Login Form

The login form for the Decision Support System Development for Determining the Best-Selling Menu for Employees at the Bank Indonesia Representative Office in North Sumatra Province Using the TOPSIS Method is shown in Figure 2.

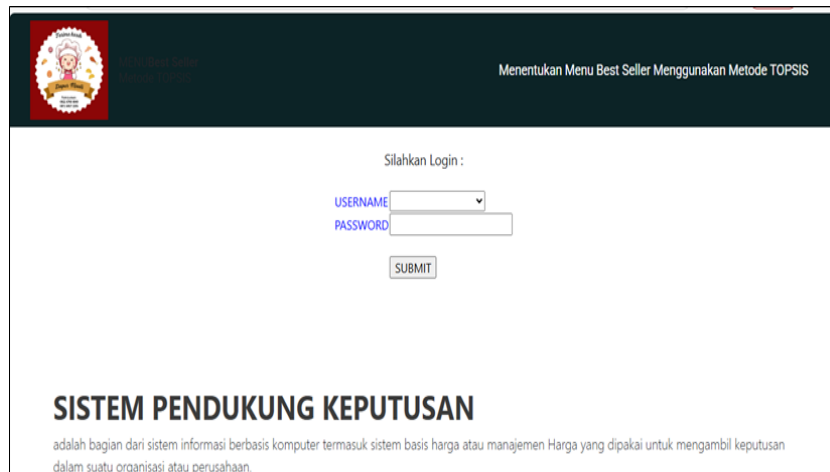


Figure 2. Login Form

2. Home From

The Home Form of the Decision Support System Development to Determine the Best Seller Menu for Employees of the Bank Indonesia Representative Office Canteen in North Sumatra Province Using the TOPSIS Method can be seen in Figure 3.

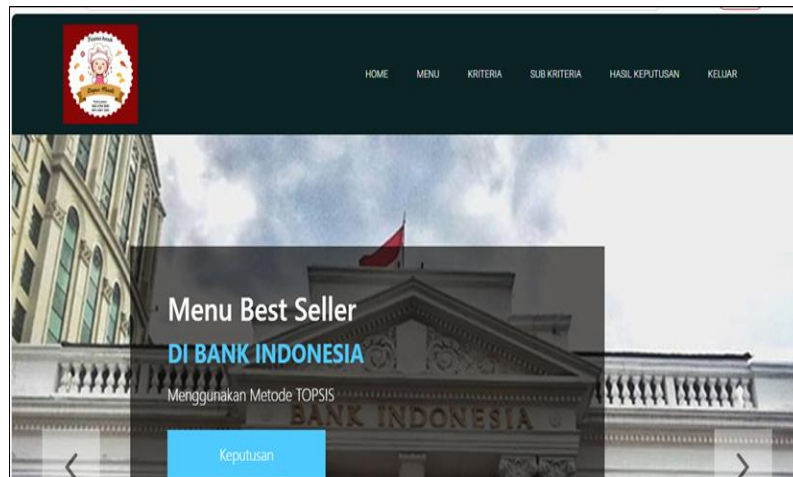


Figure 3. Home From

3. Food Menu Form

The Food Menu Form from the Development of a Decision Support System to Determine the Best Selling Menu for Employees of the Bank Indonesia Representative Office Canteen in North Sumatra Province Using the TOPSIS Method can be seen in Figure 4.

NAMA MENU	JENIS	KETERANGAN	AKSI
ayam penyyet cabai ijo	makanan berat	halal	[Add] [Delete] [Edit]
lontong sayur	makanan berat	halal	[Add] [Delete] [Edit]
nasi gurih	makanan berat	halal	[Add] [Delete] [Edit]
lontong pecal	makanan berat	halal	[Add] [Delete] [Edit]
Ikan Pepes	Makanan Berat	halal	[Add] [Delete] [Edit]

Figure 4. Food Menu Form

4. Criteria Form

The criteria form for developing a decision support system to determine the best-selling menu for employees of the canteen of the Bank Indonesia Representative Office in North Sumatra Province using the TOPSIS method can be seen in Figure 5.

KRITERIA	BOBOT	TIPE	AKSI
Kebiasaan Membeli	1	Cost	[Add] [Delete] [Edit]
Tingkat Kepuasan	2	Cost	[Add] [Delete] [Edit]
Harga Terjangkau	3	Cost	[Add] [Delete] [Edit]
Ketersediaan Menu	4	Benefit	[Add] [Delete] [Edit]
Kualitas Rasa	5	Benefit	[Add] [Delete] [Edit]

Figure 5. Criteria Form

5. Sub Criteria Form

The Sub-Criteria Form for the Development of a Decision Support System to Determine the Best Selling Menu for Employees of the Canteen of the Bank Indonesia Representative Office of North Sumatra Province Using the TOPSIS Method can be seen in Figure 6.

ID KRITERIA	SUB KRITERIA	NILAI	AKSI	
	Kebiasaan Membeli	Sangat Sering	5	[Icons]
	Kebiasaan Membeli	Sering	4	[Icons]
	Kebiasaan Membeli	Kadang-Kadang	3	[Icons]
	Kebiasaan Membeli	Jarang	2	[Icons]
	Kebiasaan Membeli	Tidak Pernah	1	[Icons]
	Tingkat Kepuasan	Sangat Puas	5	[Icons]
	Tingkat Kepuasan	Puas	4	[Icons]
	Tingkat Kepuasan	Cukup Puas	3	[Icons]
	Tingkat Kepuasan	Kurang Puas	2	[Icons]
	Tingkat Kepuasan	Tidak Puas	1	[Icons]

Figure 6. Sub Criteria Form

6. Decision Result Form

The Decision Result Form from the Development of a Decision Support System to Determine the Best Selling Menu for Employees of the Canteen of the Bank Indonesia Representative Office of North Sumatra Province Using the TOPSIS Method can be seen in Figure 7.

ID MENU	Kebiasaan Membeli	Tingkat Kepuasan	Harga Terjangkau	Ketersediaan Menu	Kualitas Rasa	KEPUTUSAN	AKSI
5	5	4	4	3	5	2	[Icons]
6	5	4	5	3	4	1	[Icons]

SISTEM PENDUKUNG KEPUTUSAN
 adalah bagian dari sistem informasi berbasis komputer termasuk sistem basis harga atau manajemen Harga yang dipakai untuk mengambil keputusan dalam suatu organisasi atau perusahaan.

Figure 7. Decision Result Form

7. Decision Search Form

The Decision Search Form from the Development of a Decision Support System to Determine the Best Seller Menu for Employees of the Canteen of the Bank Indonesia Representative Office of North Sumatra Province Using the TOPSIS Method can be seen in Figure 8.



ID Menu	Kebiasaan Membeli	Tingkat Kepuasan	Harga Terjangkau	Ketersediaan Menu	Kualitas Rasa	TOPSIS	KEPUTUSAN
ayam penyet cabai ijo	5	4	5	3	4	0.625	Rank 1
lontong sayur	5	4	4	3	5	0.375	Rank 2
nasi gurih							
lontong pecal							
Ikan Pepes							

SISTEM PENDUKUNG KEPUTUSAN
 adalah bagian dari sistem informasi berbasis komputer termasuk sistem basis harga atau manajemen Harga yang dipakai untuk mengambil keputusan dalam suatu organisasi atau perusahaan.

Figure 8. Decision Search Form

CONCLUSION

Based on the results of research conducted on the development of a Decision Support System (DSS) to determine best-selling employee menu items in the Bank Indonesia Representative Office of North Sumatra Province using the TOPSIS method, the following conclusions can be drawn: The developed system is capable of processing employee preference data based on five main criteria: purchasing habits, satisfaction level, affordability, menu availability, and taste quality, each weighted according to its level of importance. The use of this system has had a positive impact on canteen management, such as increased employee satisfaction, reduced food waste, and efficiency in menu preparation that better aligns with internal consumer preferences. The design and development of a Decision Support System (DSS) application utilizing criteria and sub-criteria allows for the systematic application of the TOPSIS method to determine best-selling menu items based on employee preferences at the Bank Indonesia Representative Office of North Sumatra Province.

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