

Development Of A Decision Support System Based On Rule-Based Systems For Determining Marketing Strategies And Superior Products at Tombo Ngelih Cafe

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Abstract

Study This, aiming to develop a system supporting decision-making based on a rule-based system in determining marketing and product strategies, featured in Cafe Tombo Smile. Method used covering data collection through observation, interviews, and studies library, and an implementation system web-based using PHP and MySQL. The test results using black-box and alpha methods that well-recommended well recommendation,, marketing and as as product product effective flagship.

Keywords: Decision Support System, Rule-Based System, Marketing Strategy, Product Feature

1. INTRODUCTION

The industry culinary experience is experiencing rapid growth, along with increasing public interest in style, experience-oriented living unique dining. In this context, a cafe is one of form very competitive business, so it requires an adaptive and data-driven marketing strategy [4]. Cafe Tombo Ngelih is one of the perpetrator businesses in the field. This faces a challenge in determining marketing strategy and selecting the appropriate flagship with preference dynamic customers.

Along with development technology information, the application system Supporter decision support system (DSS) [6] becomes a solution with potential in support taking decision strategic decision-making. One of the effective DSS approaches is a system based on rules (Rule-Based System)[2], which enables the decision-making process decision done based on rules in the form of a statement IF-THEN. System This own superiority in transparency, convenience, development, and capabilities handles semi-structured decisions.

Based on matter said, research This aiming For designing a DSS based on a Rule-Based System that can give marketing strategy recommendations in a way precise and tailored with condition as well as need specific from business cafe scale small until medium, so that can help owner business in formulate more steps focused and efficient [7]. Product featured based on historical data, sales, profit margins, and feedback from Customers at the Cafe Tombo. I'm disgusted.

2. RESEARCH METHODS

Study This use approach engineering device soft For designing and building decision-making systems (Decision Support Systems/DSS) [3] based on a rule-based system that can give marketing and product strategy recommendations. The stages method study is explained as follows:

2.1 Objects Study

The Objects study is Cafe Tombo Ngelih, which is located in Yogyakarta. The focus study lies in the development of a system that can process historical data, sales, consumer feedback, profit margins, and cost promotion for production decisions based on the rule.

2.2 Data collection

Data collected uses three main techniques:

2.3 Observation direct,

To understand the channel business, transactions, and promotional processes carried out by the cafe.

2.3.1 Interview with the cafe owner, to identify the need system, problems in determining marketing strategies, and expectations for the system built.

2.3.2 Studies library, referring to scientific journals and references related to DSS, rule-based systems, and marketing strategies in the culinary MSME sector.

2.4 Design and Development System

The system was designed and built using approach *Rule-Based System* [1]. The technology used, among others:

2.4.1 Data Flow Diagram

DAD Level 0 is used to give a general description of the entity's external, processed input and the information produced [9]. The entities in this DFD are three, namely the admin and the *owner*. Admin will input and manage data while the *owner*, as the recipient, reports Results. Level 0 Data Flow Diagram Development of DSS based on *Rules-Based Systems*, marketing, and product strategy determination. Featured can be seen in the picture :

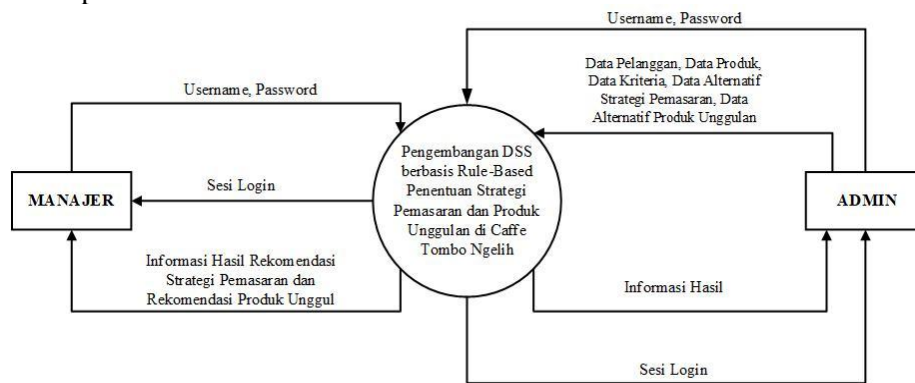


Figure 1. DAD Level 0

DAD Level 1 aims to show the main processes in A system . System Supporter decision. This consists of five processes, namely user login, data management, transaction process sales, process rule-based *systems*, as well as reporting [5]. DAD Level 1 on the system. This can be seen in the picture.

<https://journal.upy.ac.id/index.php/ASTRO/index>

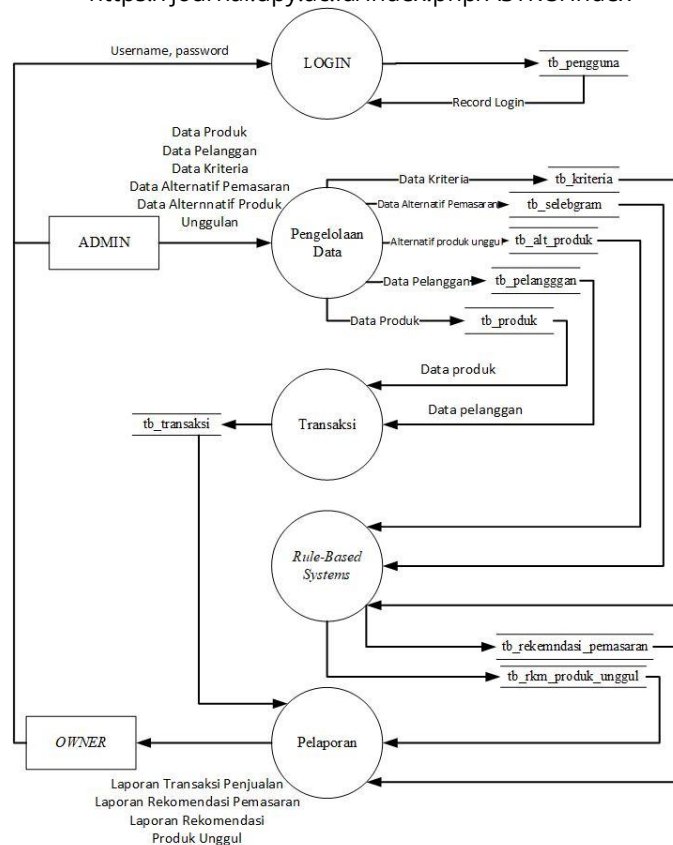


Figure 2. DAD level 1 diagram

2.4.2 Use Case Diagram

Use Case Diagram in the system Supporter decision for determining marketing and product strategies. Featured functioning as a visual representation of interaction between a system with actors involved [3]. This diagram gives a description of how the system responds to various actions from the external environment. Illustration of the Use Case Diagram shown in the image

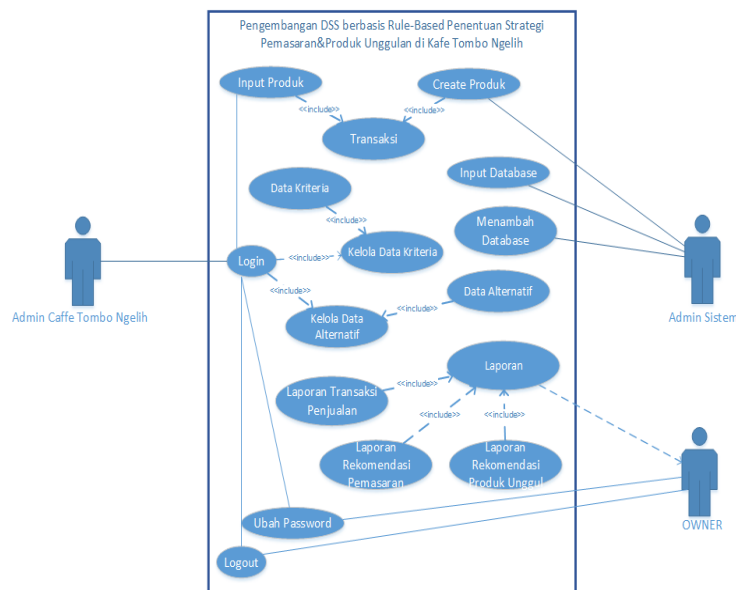


Figure 3. Use Case Diagram

2.4.3 Design Database Table

Table Users There is is table user used to store user data. There are several required columns, which can be seen in the table below. This.

No.	Nama Field	Tipe Data	Index
1.	id_pengguna	INT(5)	Primary key
2.	nama	VARCHAR(255)	
3.	email	VARCHAR(255)	
4.	password	VARCHAR(100)	

Table 1. Table Users

a) Table criteria

Product used to keep all types of products sold in the Cafe Tombo Ngelih with criteria that have been determined. For column or *field* as in the structure table criteria, products below this.

No.	Nama Field	Tipe Data	Index
1.	id_produk	INT(5)	Primary Key
2.	id_pengguna	INT(5)	
3.	nama_produk	VARCHAR(255)	
4.	kategori_produk	VARCHAR(255)	
5.	deskripsi	VARCHAR(255)	
6.	harga	DECIMAL	
7.	rating	INT(5)	
8.	status	VARCHAR(255)	

Table 2. Structure Table criteria

b) Table customer

The customer functions to keep information about customers who have registered as members at the Cafe Tombo Ngelih. Some columns or attributes are contained in the table. This can be seen in the Table following.

No.	Nama Field	Tipe Data	Index
1.	id_pelanggan	INT(5)	Primary key
2.	nama_pelanggan	INT(10)	
3.	email	VARCHAR(100)	
4.	tanggal_member	DATE	
5.	status_member	VARCHAR(100)	

Table 3. Structure Table Customer

c) Table Alternative Marketing Strategies

<https://journal.upy.ac.id/index.php/ASTRO/index>

This table is used to save alternative data for marketing to determine the right marketing strategy. The structure table can be seen in the Table in lower.

No.	Nama Field	Tipe Data	Index
1.	<u>id_strategi</u>	INT(5)	Primary key
2.	<u>id_kriteria</u>	INT(5)	
3.	<u>Nama_strategi</u>	VARCHAR(255)	
4.	<u>average_rating</u>	DECIMAL	
5.	<u>deskripsi</u>	DATE	

Table 4. Structure Table: Alternative Marketing Strategies

d) *Table Alternative Product*

Featured Table: This is a safe alternative data product, the flagship that will be processed in Rule-Based Systems. The structure table can be seen below .

No.	Nama Field	Tipe Data	Index
1.	id_alternatif_produk	INT(5)	Primary key
2.	menu_minuman_favorit	VARCHAR(255)	
3.	menu_makanan_favorit	VARCHAR(255)	
4.	menu_baru	VARCHAR(255)	
5.	produk_bundling	VARCHAR(255)	
6.	menu_sehat	VARCHAR(255)	

Table 5. Structure Table Alternative Product

e) *Rule-Based Systems Table*

Table: This uses the store data of Rule-Based Systems rules. The structure table can be seen below .

No.	Nama Field	Tipe Data	Index
1.	<u>id_rulebased</u>	INT(5)	Primary key
2.	<u>kondisi</u>	INT(5)	
3.	<u>strategi_rekomendasi</u>	VARCHAR(255)	
4.	rating	INT(5)	

Table 6. Structure Table Rule-Based Systems

3. RESULTS AND DISCUSSION

3.1. Implementation System

Development of DSS based on *Rule-based Systems* can help Cafe Tombo Ngelih determine marketing and product strategies for its flagship based on the *Web*. Implementation system: This needs *hardware* and *software*. The *hardware* used is: *processor*, *memory*, and *hard disk*. While *software*, namely PHP and Laravel programming languages, MySQL database, *Visual Studio Code*, *Chrome browser*, and *Xampp* [6]. DSS display based on *Rule-based Systems* for determining marketing and product strategies. Featured in Cafe Tombo Ngelih as follows:

3.1.1 Admin Login View

The admin login page is working as a gateway for administrators to access the system. This feature designed use guard data security from access users who do not authorized. On this page, the admin is asked to enter the username and password. Display interface. The login page is shown in the following Figure.

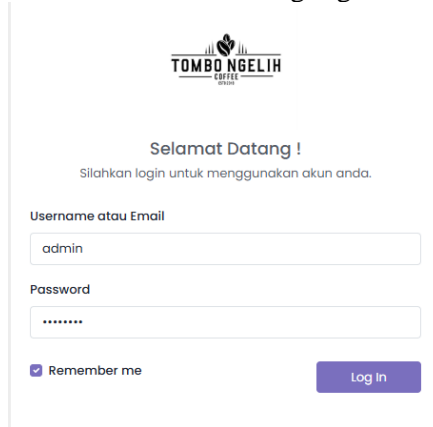


Figure 4. Admin Login View

3.1.1 Admin Dashboard Page

The dashboard page is the page after the admin logs in. In the image below, this is the dashboard view for the admin that displays transaction latest transactions from sales, total orders, total revenue, and total customers.

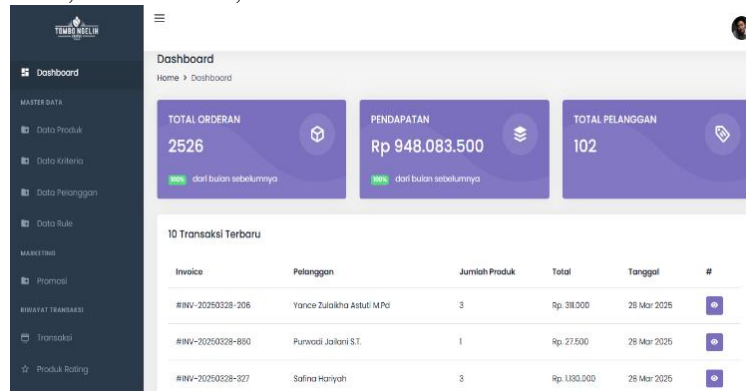


Figure 5. Admin Dashboard View

3.1.2 Product Data Page

The Product Data Page is the page used by the admin to display Miscellaneous products sold by Cafe Tombo Ngelih. Buttons add, edit, and delete are used for adding, editing, and deleting product data. In the image below, this appearance product data page.

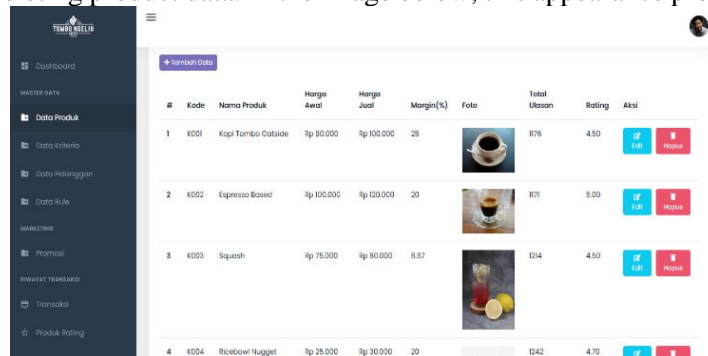


Figure 6. Page Views Product

3.1.3 Criteria Data Page

In the image below, this is the Criteria Data Page that the admin uses to display 5 criteria that are currently used by Cafe Tombo Ngelih. There is knob add data to add the required criteria. In addition That the criteria entered are also there for edit and delete actions if needed.

#	Nama	Variabel	Nilai	Aksi
1	Penjualan	S	500	[Edit] [Hapus]
2	Margin keuntungan (%)	M	40	[Edit] [Hapus]
3	Feedback Pelanggan	F	4	[Edit] [Hapus]
4	Frekuensi Pembelian Bersama	Fb	100	[Edit] [Hapus]
5	Biaya Promosi (Rp)	Cp	500000	[Edit] [Hapus]

Figure 7. Criteria Data View

3.1.4 Customer Data Page

Customer Data Page in the image below. This is a page that displays customer data that has become a member at the Cafe Tombo Ngelih. Customer data includes email, date of becoming a member, and what is the member's status: active / not. With the existence of customer data then bonus discount/reduction Prices at the Cafe Tombo Ngelih will prioritize registered customers to become a members.

#	Jenis Pelanggan	Nama	Email	Tanggal Member	Status Member	Aksi
1	Member	Azis	azis@gmail.com	2025-03-24	aktif	[Edit] [Hapus]
2	Member	Aisyah	aisyah@gmail.com	2025-03-24	aktif	[Edit] [Hapus]
3	Member	Pudi Haryani M.I.L	jaka71@example.org	2018-05-29	aktif	[Edit] [Hapus]
4	Member	Gerda Iamba	indakuharni@example.org	1970-05-20	aktif	[Edit] [Hapus]
5	Member	Hari Napsupu	mulyanibakiono@example.org	1973-12-15	aktif	[Edit] [Hapus]

Figure 8. Customer Data View

3.1.5 Rule Data Page

On the Rule Data Page is displayed rule calculation method Rule-based systems is displayed. Under this picture is the rule data page.

#	Nama Rule	Kondisi	Deskripsi	Aksi
1	Produk Unggulan	If Penjualan (S) > 500.00 AND Feedback Pelanggan (F) > 4.00 AND Margin keuntungan (S) (M) > 40.00	Menampilkan produk unggulan	[Detail] [Edit] [Hapus]
2	Diskon 10% pada Happy Hour	If Penjualan (S) > 500.00 AND Margin keuntungan (S) (M) > 40.00	Diskon pada jam tertentu	[Detail] [Edit] [Hapus]
3	Promosi Online	If Feedback Pelanggan (F) > 4.00 AND Biaya Promosi (Rp) (Cp) < 500000.00	Menggunakan media sosial untuk mengiklankan produk unggulan.	[Detail] [Edit] [Hapus]
4	Promo bundling	If Penjualan (S) > 300.00 AND Penjualan (S) < 500.00	Menggabungkan beberapa produk dalam satu paket promosi	[Detail] [Edit] [Hapus]

Figure 9. Rule Data View

3.1.6 Promotion Page

In the picture following, this is a page that displays promotional data, after the system has counted with established rules and criteria determined, so results will display promotional data product Cafe Tombo. I'm disgusted.

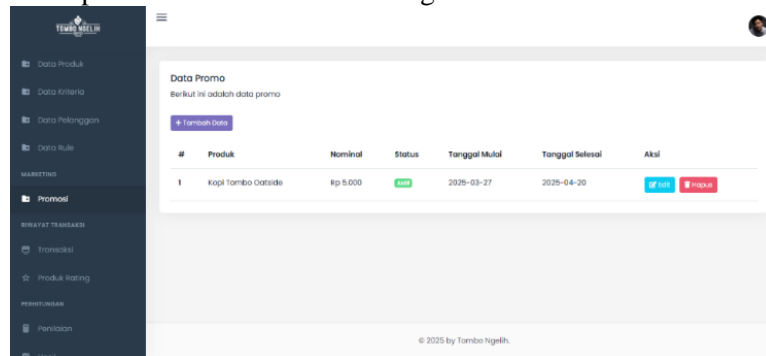


Figure 10. Appearance Promotion

3.1.7 Transaction Page

On the page, in the image transaction, there is a menu to add data that will be displayed transaction page. When it occurs, transactions at the Cafe Tombo Ngelih, then the admin can use this page as a visitor invoice recording. The system differentiates between types of visitors who are members or not. Admin can choose the type of customer moment, create an invoice like the Image view page add transaction data.

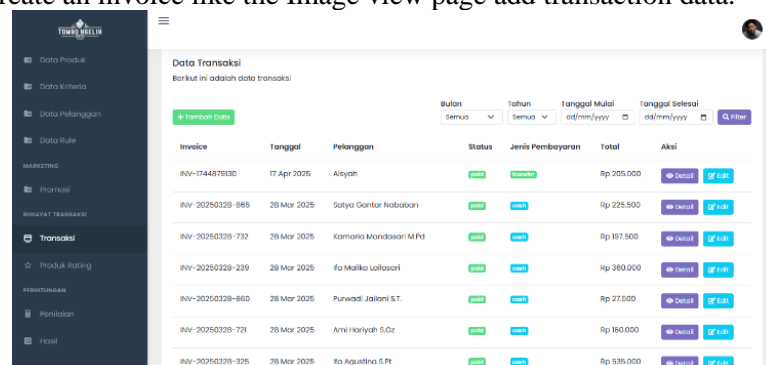


Figure 11. Transaction Admin Login View

3.1.8 Results Page

Under this is the appearance page results, the Image contains products that can be promoted, referring to the results recommendation. The system displays results recommendations with the choice of the month and year to come, making it easier for the admin to implement promotions.

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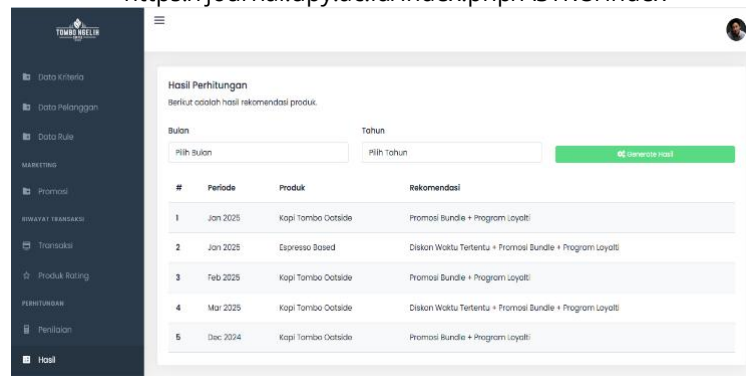


Figure 12. Results Page

3.1.9 Web Owner login view

The owner login page is provided specially for the owner or manager to access the system. On this page, the user needs to fill in form in the form with a username and password. After the login process is successful, the system will display the main dashboard view. The illustration login page can be seen in the following image.

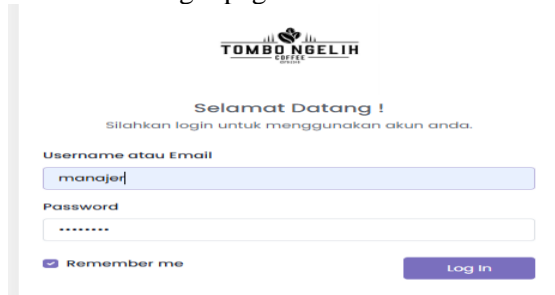


Figure 13. Owner/ Manager Login Page

3.1.10 Manager Dashboard Page

The dashboard page is the page after the manager succeeds in logging in. The page displayed the same as the admin dashboard page. On the dashboard manager display transaction latest, total orders, income, and total customers automatically will update every There is added. In the image below, this is the dashboard view for a manager.

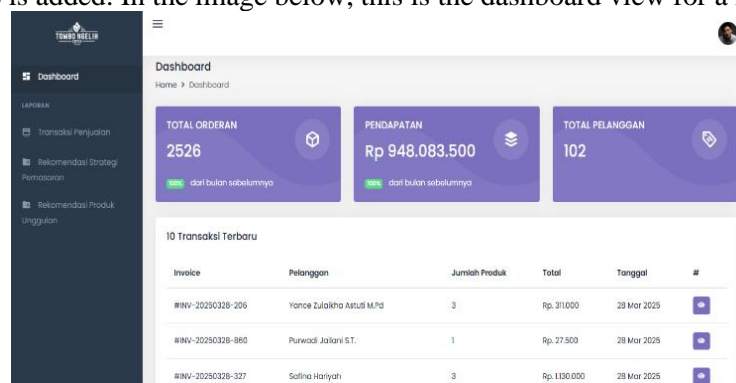


Figure 14. Manager Dashboard Page

3.1.11 Transaction Data Page Sale

After the dashboard page, transaction sales are also one of the views on the Manager page. A report transaction sale consists of a sales invoice, date of transaction, name of customer, member status, type of payment, and total sales. The month and year

filter reports have also been provided system. View the transaction data page sale can be seen in the image below.

Invoice	Tanggal	Pelanggan	Status	Jenis Pembayaran	Total	Aksi
INV-20250328-721	28 Mar 2025	Ami Hariyah S.Gr	paid	cash	Rp 150.000	Detail
INV-20250328-848	28 Mar 2025	Rino Yunita Yularti S.Kom	paid	cash	Rp 282.500	Detail
INV-20250328-732	28 Mar 2025	Karnaria Mandasari M.Pd	paid	cash	Rp 197.500	Detail
INV-20250328-704	28 Mar 2025	Alambana Iswahyudi	paid	cash	Rp 272.000	Detail
INV-20250328-997	28 Mar 2025	Cinthia Zulfa Wasud M.Ak	paid	cash	Rp 480.000	Detail
INV-20250328-860	28 Mar 2025	Purwadi Jalani S.T.	paid	cash	Rp 27.500	Detail
INV-20250328-897	28 Mar 2025	Kambali Darsian Saragih M.Pd	paid	cash	Rp 256.000	Detail

Figure 15. Transaction Data Page Image Sale

3.1.12 Marketing Strategy Recommendations Page

On the page, the Marketing Strategy Recommendations report is provided in the form of marketing strategy data product every month, and also every year later if the system has used Cafe Tombo Smile. There are strategy report filters that can be chosen by the owner to know the report in detail for each month, which can be seen in the image below.

Bulan	Kode Produk	Produk	Rekomendasi	Alasan
Mar 2025	K001	Kopi Tombo Outside	Diskon Waktu Tertentu + Promosi Bundle + Program Loyalti	Tingkat penjualan tinggi (1964 unit), feedback pelanggan 2,9/5, biaya promosi Rp1.355.000, margin 25%, frekuensi pembelian bersama 273 kali
Feb 2025	K001	Kopi Tombo Outside	Promosi Bundle + Program Loyalti	Tingkat penjualan tinggi (1438 unit), feedback pelanggan 3,0/5, margin 25%, frekuensi pembelian bersama 203 kali
Jan 2025	K001	Kopi Tombo Outside	Promosi Bundle + Program Loyalti	Tingkat penjualan tinggi (1458 unit), feedback pelanggan 2,7/5, margin 25%, frekuensi pembelian bersama 239 kali
Jan 2025	K002	Espresso Based	Diskon Waktu Tertentu + Promosi Bundle + Program Loyalti	Tingkat penjualan tinggi (1458 unit), feedback pelanggan 2,7/5, margin 25%, frekuensi pembelian bersama 239 kali
Dec 2024	K001	Kopi Tombo Outside	Promosi Bundle + Program Loyalti	Tingkat penjualan tinggi (1002 unit), feedback pelanggan 2,8/5, margin 25%, frekuensi pembelian bersama 140 kali

Figure 16. Page Marketing Strategy Recommendations

3.1.13 Recommendation Page Product Featured

Image below: This is the appearance page report recommendation product featured. This page will serve report What just product, Featured Cafe Tombo Ngelih, with sale high profit margin with the best average customer feedback, the highest rating from 1-5, and a recommendation strategy marketing that can be done with discounts interesting to customers.

#	Produk	Penjualan	Margin Keuntungan (Rata-Rata)	Feedback Pelanggan	Strategi Rekomendasi
1	Kopi Tombo Outside	33440	25.53 %	4.5	Promosi Bundle + Program Loyalti
2	Espresso Based	1674	23.54 %	5	Diskon Waktu Tertentu + Promosi Bundle + Program Loyalti

4. CONCLUSION

Based on the results study DSS DSS-based development of *Rule-Based Systems*, determining marketing and product strategies featured in Cafe Tombo Ngelih, we can conclude as follows:

- a) Study This capable produce system Supporter decision For help determine marketing and product strategies Featured in Cafe Tombo Ngelih. The system that was created can help determine, in a fast and automatic way, showcase marketing and product strategies, and their superiority.
- b) The system creates and produces determining marketing and product strategies, the right choice with the method *Rule Based Systems*, as well as displays information about the sales products every year.
- c) Test results DSS system for determining marketing and product strategies. Featured. This shows that the system can walk with good. This is can proven with more from 50% of respondents answer agree with program display and menu and program features, 43% answered strongly agree with satisfaction in use of the program, more from 50% of respondents answer agree with convenience systems and benefits that produced from system, 100% answer agree For benefit system for users, and 86% answered agree For capabilities and functions system. From the results of the percentage test, the performance system has shown system is walk with good and is operating optimally, and can be used as expected.

SUGGESTION

Suggestions that can be given for the development DSS system for determining marketing and product strategies. Featured This includes:

A developer can furthermore develop Again system with added features, such as feature feature-organized cashier , besides taking notes on transaction sales, but also can automatically arrange channel payments as well as manage stock goods.

System This made the Still web-based, so that For study can be made hybrid-based.

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