

## Property Product Recommendation System as a Marketing Strategy at PT. Java Abadi Sejahtera

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**ABSTRACT** – This study addresses the challenges faced by PT. Java Abadi Sejahtera in matching customer needs with available property products and the frequent data loss caused by manual recording processes. A web-based recommendation system was developed using the Profile Matching method, where criteria such as property type, location, size, price, payment method, and facilities are weighted according to their importance and processed using GAP calculations to determine the suitability between customer requirements and product data. Black box and white box testing results indicate that the system functions correctly and is able to process product data, customer member data, and follow-up data accurately. The system generates ranked product recommendations based on suitability calculations. The findings demonstrate that the recommendation system effectively supports marketing decision-making, improves the efficiency of the matching process, and enhances the overall quality of marketing strategies implemented by the company.

**Keywords** - Decision Support System, Profile Matching, Property Product, Customer Member.

## Sistem Rekomendasi Produk Properti Sebagai Strategi Marketing Pada PT. Java Abadi Sejahtera

**ABSTRAK** – Penelitian ini dilakukan untuk mengatasi permasalahan di PT. Java Abadi Sejahtera yang masih mengalami kesulitan dalam mencocokkan kebutuhan customer dengan produk properti yang tersedia serta sering kehilangan data akibat proses pencatatan manual. Untuk itu, dikembangkan sistem rekomendasi produk properti berbasis web menggunakan metode Profile Matching, di mana setiap kriteria seperti jenis properti, lokasi, luas, harga, metode pembayaran, dan fasilitas diberi bobot sesuai tingkat kepentingannya, kemudian diproses menggunakan perhitungan GAP untuk menentukan tingkat kesesuaian antara kebutuhan customer dan data produk. Hasil pengujian black box dan white box menunjukkan bahwa seluruh fitur sistem berjalan baik dan mampu mengolah data produk, data customer member, serta data tindak lanjut secara akurat. Sistem ini menghasilkan rekomendasi produk dalam bentuk peringkat kesesuaian. Temuan penelitian menunjukkan bahwa sistem rekomendasi ini efektif membantu tim marketing dalam pengambilan keputusan serta meningkatkan efisiensi dan kualitas strategi pemasaran.

**Kata Kunci** – Sistem Pendukung Keputusan, Profile Matching, Produk Properti, Customer Member

### 1. INTRODUCTION

A house is not a final product but rather a developing one. A house is not only a physical form but more of a process that grows and evolves. In this sense, a house is no longer a static product, but a product meant to fulfill dynamic needs. This means

that changes will occur depending on the situations and conditions [1].

Urban population growth in Indonesia is indeed higher than that of rural areas. As a result, this has led to a surge in demand for property with various functions that suit customer needs. PT. Java Abadi Sejahtera is a company engaged in property marketing services as an agent. The company was

established about four years ago and has continued to grow until today. Around 35 marketing staff work under the company to help sell property products to customers in need.

In the current property sales process, the marketing team still uses a manual system, namely recording customer needs one by one. Both the company and the marketing staff also continue to use manual systems in recording various product sales. Moreover, the large amount of property product data and customer needs often makes it difficult for the marketing staff to match products with the appropriate customer requirements. The product offering process is also still carried out manually, through face-to-face meetings and direct visits to customers. Furthermore, there is still no regular progress report on follow-ups regarding customer needs. This can hinder the marketing strategy in selling property products that meet customer demands. Consequently, marketing staff cannot achieve their sales targets, which may result in losses for the company.

The purpose of this final project research is to develop a web-based recommendation system that will provide solutions for decision-making regarding property products that are suitable and aligned with customer needs, thereby assisting the marketing staff in determining sales strategies and improving sales performance. This recommendation system applies the Profile Matching Method, since this method involves criteria with sub-criteria that are weighted and scored for each sub-criterion, such as property type, location, size, selling price, payment method, and facilities. These criteria are then processed to produce the most desirable alternative.

## 2. LITERATURE REVIEW

The development of information technology has influenced various sectors, including the property industry, through the use of Decision Support Systems (DSS). According to Makamu (2011), the growth of urban populations has increased the demand for housing and property, requiring more effective marketing strategies. The basic theory of decision-making as explained by Hasan (2004) provides the foundation for developing analytical methods in recommendation systems. Meanwhile, David (2003) emphasized the role of *Data Flow Diagram (DFD)* in modeling data flows within information systems, which is also relevant for building recommendation applications.

Several approaches have been employed to address product recommendation challenges. Lang, Sarker, Bhavsar, and Boley (2005) developed the *Weighted-Tree Simplicity Algorithm* to match product

descriptions, highlighting the importance of similarity matching methods in aligning products with user needs. In the property sector, Bastiah (2013) utilized the *Fuzzy C-Means (FCM) Clustering* method to support house purchasing decisions, showing how clustering helps consumers select products based on preference similarities. Similarly, Ong (2013) applied the *K-Means Clustering* algorithm for marketing strategies, demonstrating the effectiveness of clustering in market segmentation and customer targeting.

In addition to clustering, ranking-based approaches have also been studied. Bahri, Muchlis, and Tajidun (2016) compared the *Profile Matching* and *PROMETHEE* methods in determining scholarship recipients. Their findings revealed that *Profile Matching* was more effective in cases that require weighting across multiple criteria and sub-criteria. This is particularly relevant in the property sector, where product selection depends not only on a single factor but also on a combination of property type, location, size, price, payment method, and facilities.

**Research Gap Analysis.** The literature indicates that most previous studies focused on clustering methods, which generally provide segmentation but lack consideration for detailed weighting of criteria. In contrast, the study by Munawaroh, Choiron, and Shanty (n.d.) contributes by implementing the *Profile Matching* method for property product recommendations. The novelty lies in assigning weights and scores to each sub-criterion, enabling the system to produce more precise and tailored recommendations. Thus, this research introduces a new application of *Profile Matching* in property marketing strategies, which has been less explored in prior studies.

## 3. RESEARCH METODOLOGI

The algorithm of the recommendation system using the Profile Matching method is illustrated in Figure 1. The system users, namely the Marketing Associates and Marketing Office, first input several required data including product data, user data, weighting data, customer member data, and follow-up data. Once the data are entered into the system, it then matches the product data with the follow-up data using Profile Matching calculations and produces recommendation outputs that can serve as information for customer offers.

Based on Figure 1, the data processing flow algorithm of the Property Product Recommendation System as a Marketing Strategy at PT. Java Abadi Sejahtera is as follows:

1. **Inputting required data.**

Entering user data, product data, customer

data, and follow-up data.

2. **Assigning weights to main criteria.**

Assigning the primary weight values according to Table II.

3. **Follow-up process with customer members.**

This process is carried out by Marketing Associates by calling or meeting each customer member to obtain detailed information regarding their needs.

4. **GAP mapping.**

GAP mapping is obtained from subtracting the parameter values in the product data with the follow-up data.

5. **Weighting the GAP values.**

GAP weighting is obtained by matching the results of GAP mapping with the GAP weighting values in accordance with the rules of the Profile Matching method, as shown in Table I below.

Table 1. GAP Score Weight

Selisih	Bobot Nilai	Keterangan
0	9	Tidak ada selisih (kompetensi sesuai dengan kebutuhan
1	8,5	Kompetensi kelebihan 1 tingkat / level
-1	8	Kompetensi kekurangan 1 tingkat / level
2	7,5	Kompetensi kelebihan 2 tingkat / level
-2	7	Kompetensi kekurangan 2 tingkat / level
3	6,5	Kompetensi kelebihan 3 tingkat / level
-3	6	Kompetensi kekurangan 3 tingkat / level
4	5,5	Kompetensi kelebihan 4 tingkat / level
-4	5	Kompetensi kekurangan 4 tingkat / level
5	4,5	Kompetensi kelebihan 5 tingkat / level
-5	4	Kompetensi kekurangan 5 tingkat / level
6	3,5	Kompetensi kelebihan 6 tingkat / level
-6	3	Kompetensi kekurangan 6 tingkat / level
7	2,5	Kompetensi kelebihan 7 tingkat / level
-7	2	Kompetensi kekurangan 7 tingkat / level
8	1,5	Kompetensi kelebihan 8 tingkat / level
-8	1	Kompetensi kekurangan 8 tingkat / level

6. **Calculation of sub-criteria for core factor and secondary factor.**

After obtaining the GAP weight values, the

process continues with the calculation of sub-criteria from the parameter values categorized as either core factors or secondary factors.

7. **Calculation of the average sub-criteria values.**

The average sub-criteria values are obtained from each sub-criterion of the main criteria.

8. **Calculation of ranking with main criteria weighting.**

The ranking calculation is obtained by applying the main criteria weights to the average values of the sub-criteria.

9. **Product recommendation.**

The final result generated as the system's output is the product recommendation, which represents the outcome of the calculations using the method above.

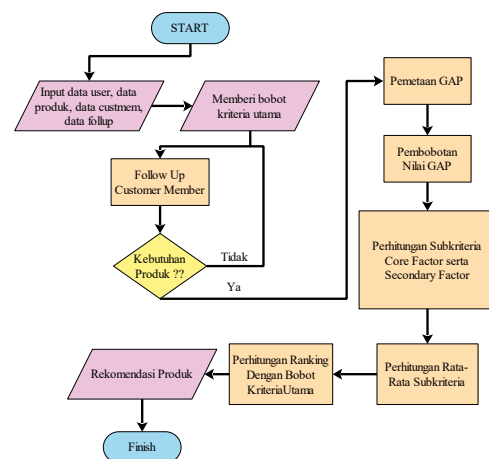


Figure 1. Profile Matching Method

**Classification and Parameter Scores.**

The weights assigned to each criterion, sub-criterion, and parameter are obtained from interviews and direct field observations conducted by the Marketing Office, as well as agreements with the director as the head of PT. Java Abadi Sejahtera. Sub-criteria with very high importance or higher priority are classified as core factors, while sub-criteria with lower importance are classified as secondary factors. In accordance with the provisions of the Profile Matching method, the total weight values of the main criteria must sum up to 100. The weighting of criteria in the system development is presented in Table II below.

Table 2. Criteria & Weight Model

Criteria	Weight (%)
Jenis Properti	20%
Lokasi Properti	20%
Luas Properti	15%
Harga Jual	20%
Cara Bayar	15%
Fasilitas	10%

The criteria used in the competency gap calculation consist of several sub-criteria and parameters, namely:

### 1. Property Type

The property type criterion is used to determine the level of demand for certain types of property. This criterion consists of two sub-criteria, and the determination of the Core Factor and Secondary Factor can be seen in Table 3.

Table 3. Subcriteria of Property Type

No.	Subcriteria	Weight (%)	Ket.
1.	Primary	60%	CF
2.	Secondary	40%	SF

Based on Table 3, the parameters and scores for each sub-criterion are determined. The parameters for the primary sub-criteria can be seen in Tables 4 and 5.

Table 4. Parameter Primary (P)

Parameter (P)	Score
Rumah	7
Apartement	6
Ruko	5
Tanah	4
Gudang	3
Soho	2
Villa	1

Table 4 presents the primary parameter scores for different property types, where higher scores indicate greater priority in the recommendation process. Houses receive the highest score, followed by apartments, shop-houses, land, warehouses, Soho units, and villas in descending order. These scores are used as reference values in the GAP calculation to determine how well each property matches customer needs.

Table 5. Parameter Secondary (S)

Parameter (S)	Score
Rumah	7
Apartement	6
Ruko	5
Tanah	4
Gudang	3
Soho	2
Villa	1

Table 5 provides the secondary parameter scores for various property types, using the same scoring structure as the primary parameters. The scores rank houses as the most preferred type, followed by apartments, shop-houses, land, warehouses, Soho units, and villas. These secondary scores support the GAP calculation by evaluating additional aspects of property type suitability in the recommendation

process.

### 2. Property Location.

This criterion aims to identify or describe the condition of the proposed property location. The property location criterion consists of two sub-criteria. The sub-criteria used for property location can be seen in Table 6.

Table 6. Property Location Subcriteria

No.	Subcriteria	Weight (%)	Ket.
1.	Dalam Kota Surabaya (DKS)	60%	CF
2.	Luar Kota Surabaya (LKS)	40%	SF

Based on Table 6, the parameters and scores for each sub-criterion are determined. The parameters for the property location sub-criteria can be seen in Tables 7 and 8.

Table 7. Parameters in Surabaya City (DKS)

Parameter (DKS)	Score
Surabaya Pusat	5
Surabaya Utara	4
Surabaya Timur	3
Surabaya Selatan	2
Surabaya Barat	1

Table 7 lists the parameter scores for property locations within Surabaya City, where higher scores represent areas considered more strategic or desirable. Central Surabaya receives the highest score, followed by North, East, South, and West Surabaya. These scores help the system evaluate how well a property's location aligns with customer preferences during the recommendation process.

Table 8. Surabaya Out-of-City Parameters (LKS)

Parameter (LKS)	Score
Sidoarjo	4
Gresik	3
Pasuruan	2
Malang	1

Table 8 presents the parameter scores for property locations outside Surabaya City, with Sidoarjo receiving the highest score, followed by Gresik, Pasuruan, and Malang. The scoring reflects the relative attractiveness and accessibility of each surrounding area based on company assessment. These values are used in the GAP calculation to measure the suitability of out-of-city locations for customer needs.

### 3. Property Size

This criterion describes the size requirements, both for the building and the land of the property product. The property size criterion consists of two sub-criteria. The sub-criteria used for property size can be seen in Table 9.

Table 9. Property Area Subcriteria

No.	Subcriteria	Weight (%)	Ket.
1.	Luas Tanah (LT)	60%	CF
2.	Luas Bangunan (LB)	40%	SF

Based on Table 9, the parameters and scores for each sub-criterion are determined. The parameters for the property size sub-criteria can be seen in Tables 10 and 11.

Table 10. Land Area Parameters (LT)

Parameter (LT)	Score
30 – 50 m <sup>2</sup>	8
51 – 70 m <sup>2</sup>	7
71 – 90 m <sup>2</sup>	6
91 – 120 m <sup>2</sup>	5
121 – 150 m <sup>2</sup>	4
151 – 180 m <sup>2</sup>	3
181 – 1000 m <sup>2</sup>	2
>= 1000 m <sup>2</sup>	1

Table 10 presents the parameter scores for land area categories used in evaluating property suitability. Larger land areas receive lower scores, indicating that smaller to medium-sized plots are more desirable based on the company's criteria. The scoring ranges from 8 for 30–50 m<sup>2</sup> down to 1 for land areas above 1000 m<sup>2</sup>. These values are applied in the GAP calculation to assess how closely a property's land size matches customer preferences.

Table 11. Building Area Parameters (LB)

Parameter (LB)	Score
25 – 50 m <sup>2</sup>	8
51 – 70 m <sup>2</sup>	7
71 – 90 m <sup>2</sup>	6
91 – 120 m <sup>2</sup>	5
121 – 150 m <sup>2</sup>	4
151 – 180 m <sup>2</sup>	3
181 – 1000 m <sup>2</sup>	2
>= 1000 m <sup>2</sup>	1

Table 11 outlines the parameter scores for building area categories, which follow the same scoring logic as the land area parameters. Higher scores are assigned to smaller building sizes, reflecting a higher level of suitability within the system's evaluation model. The scores range from 8 for 25–50 m<sup>2</sup> and decrease to 1 for building sizes above 1000 m<sup>2</sup>. These parameter scores help determine the degree of compatibility between a product's building area and the customer's required specifications.

#### 4. Selling Price.

This criterion aims to determine the selling price value of the property product. The selling price

criterion consists of two sub-criteria. The sub-criteria used for selling price can be seen in Table 12.

Table 12. Selling Price Subcriteria

No.	Subcriteria	Weight (%)	Ket
1.	Harga Diskon (HD)	60%	CF
2.	Harga Tanpa Diskon (HTD)	40%	SF

Based on Table 12, the parameters and scores for each sub-criterion are determined. The parameters for the selling price sub-criteria can be seen in Tables 13 and 14.

Table 13. Discounted Price Parameters (HD)

Parameter (HD)	Score
<=Rp. 200 juta	7
Rp. 200 juta – Rp. 500 juta	6
Rp. 500 juta – Rp. 800 juta	5
Rp. 800 juta – Rp. 1 M	4
Rp. 1 M – 2 M	3
Rp. 2 M – 3 M	2
>= Rp. 3 M	1
Rp. 0	0

Table 13 outlines the parameter scores for the Discounted Price category, where lower property prices receive higher scores. This scoring structure indicates that more affordable properties are considered more suitable according to the system's evaluation criteria. The score ranges from 7 for prices under Rp. 200 million to 1 for prices above Rp. 3 billion, with 0 assigned when no price data is available. These scores play an important role in calculating the GAP value to measure the alignment of discounted prices with customer expectations.

Table 14. Non-Discounted Price Parameters (HTD)

Parameter (HTD)	Score
<=Rp. 200 juta	7
Rp. 200 juta – Rp. 500 juta	6
Rp. 500 juta – Rp. 800 juta	5
Rp. 800 juta – Rp. 1 M	4
Rp. 1 M – 2 M	3
Rp. 2 M – 3 M	2
>= Rp. 3 M	1
Rp. 0	0

Table 14 presents the parameter scores for the Non-Discounted Price category, using the same scoring pattern as the discounted price parameters. Properties with lower standard prices receive higher scores, reflecting their greater desirability within the evaluation model. The scoring ranges from 7 for properties priced below Rp. 200 million down to 1 for those exceeding Rp. 3 billion, with 0 indicating no listed price. These scores help assess whether a property's actual price aligns with the customer's

financial criteria during the recommendation process.

### 5. Payment Method.

This criterion aims to identify the various payment methods available for the property product. The payment method criterion consists of two sub-criteria. The sub-criteria used for payment method can be seen in Table 15.

Table 15. Payment Method Subcriteria

No.	Subcriteria	Weight (%)	Ket.
1.	Cicilan (C)	60%	CF
2.	Tunai (T)	40%	SF

Based on Table 15, the parameters and scores for each sub-criterion are determined. The parameters for the payment method sub-criteria can be seen in Tables 16 and 17.

Table 16. Installment Payment Parameters (C)

Parameter (C)	Score
Angsuran 3 tahun	4
Angsuran 5 tahun	3
Uang Muka & Pelunasan KPR	2
Uang Muka & Pelunasan Angsuran	1

Table 16 presents the parameter scores for installment payment methods, where different financing durations are assigned specific scores. Shorter installment periods receive higher scores because they are considered more favorable and efficient within the evaluation model. The scoring ranges from 4 for a 3-year installment to 1 for down payment followed by installment completion. These values help determine how well a property's installment option aligns with a customer's preferred payment method during the recommendation process.

Table 17. Cash Payment Parameters (T)

Parameter (T)	Score
Tunai melalui Developer	2
Tunai melalui Bank KPR	1

Table 17 provides the parameter scores for cash payment methods, evaluating how each type of cash transaction contributes to overall suitability. Cash payments made directly through the developer receive a higher score compared to cash payments processed via a mortgage bank. This scoring reflects the simplicity and perceived advantage of direct cash transactions. The assigned values are then used in the GAP calculation to assess compatibility between customer payment preferences and property payment options.

### 6. Facilities

This criterion aims to identify the various facilities provided by the property product. The facilities criterion consists of two sub-criteria. The sub-criteria used for facilities can be seen in Table 18.

Table 18. Facilities Subcriteria

No.	Subcriteria	Weight (%)	Ket.
1.	Utilitas (C)	60%	CF
2.	Umum (T)	40%	SF

Based on Table 18, the parameters and scores for each sub-criterion are determined. The parameters for the facilities sub-criteria can be seen in Tables 19 and 20.

Table 19. Utility Facilities Parameters (UT)

Parameter (Ut)	Score
Jaringan listrik	Ditentukan
Air bersih	berdasarkan jumlah
Gas rumah tangga	sub parameter

Table 19 presents the parameter scores for utility facilities, which include essential infrastructure such as electricity networks, clean water supply, and household gas systems. The scoring depends on the number of utility features available in a property, where more complete utilities result in higher scores. This approach reflects the importance of basic functional facilities in determining property suitability. These scores are then used in the GAP calculation to evaluate how well a property's utilities match customer expectations.

Table 20. Public Facilities Parameters (UM)

Parameter (Um)	Score
Akses jalan	Ditentukan berdasarkan jumlah sub parameter
Saluran air kotor	
Lampu PJU	
Keamanan	
Pemeliharaan lingkungan	
Taman	
Tempat ibadah	

Table 20 outlines the parameter scores for public facilities surrounding a property, such as road access, drainage, street lighting, security, environmental maintenance, parks, and places of worship. Similar to utility facilities, higher scores are given when more public facilities are available. This scoring system highlights the significance of neighborhood infrastructure and amenities in assessing property attractiveness. The resulting scores contribute to the overall suitability calculation within the recommendation system.

#### 4. RESULT AND DISCUSSION

The test results from the design and development of the property product recommendation system application as a marketing strategy at PT. Java Abadi Sejahtera were carried out using black box testing and white box testing.

##### A. Black Box Testing.

Black box testing is the stage of system testing that focuses on system details (application interface) and the functions/features available in the system. Due to space limitations, the authors will present several results from the black box testing as follows:

##### 1. Menu

As discussed previously, the system is divided into three entities, therefore the Menu is also divided into three parts. The menu for the Marketing Office user level can be seen in Figure 2. The menu for the Marketing Associate user level can be seen in Figure 3. Lastly, the menu for the Customer/User visitor level can only access the recommendation results dashboard, which can be seen in Figure 4.

##### 2. Product Data

This page is the main page of the application, consisting of information on all products that have been entered by the user, as shown in Figure 5.

##### 3. Customer Member

This page can only be accessed by Marketing Associate users and functions to input customer member data they have obtained, as shown in Figure 6.

##### 4. Follow-Up Data.

This page can only be accessed by Marketing Associate users and functions to input the follow-up data carried out by the Marketing Associates. On this page, the output will be generated in the form of product recommendations, which will be used by the Marketing Associates as material to arrange their marketing strategies, as shown in Figure 7.

NO	NAMA	JENIS	ALAMAT	LOKASI	L1	L2	HARGA JUAL	CARA BAYAR
10	MAHA	JENIS	ALAMAT	LOKASI	L1	L2	HARGA JUAL	CARA BAYAR
20	Pelican Hills	Rumah	Jl. Abu Mading, Sempur, Bojonegara	Gresik	80	70	Rp. 1.500.000.000,-	Cang Muka & Pelunasan KPR
22	Pelican Hills	Apartment	Jl. Kiburi Darmas Subdan, Mulyorejo, Klaten	Surabaya Timur	0	30	Rp. 600.000.000,-	Angsuran & Tunai
23	Pelican Hills	Ruko	Jl. Tanjung Sakti 150 Mawar	Surabaya Utara	65	50	Rp. 1.200.000.000,-	KPR Bank
24	Harding Karanganyar	Tanah	Jl. Karanganyar, Karanganyar	Surabaya Selatan	200	0	Rp. 1.500.000.000,-	Cang Muka & Pelunasan KPR
25	Pengembangan Pengembangan	Budang	Jl. Mangrove, Tondol	Surabaya Barat	600	0	Rp. 1.500.000.000,-	Cang Muka & Pelunasan KPR
26	Pelican Hills	Apartment	Jl. Mangrove, Klaten	Surabaya Timur	0	40	Rp. 700.000.000,-	KPR Bank
32	Rumahnya	Rumahnya	Jl. Mangrove, Klaten	Gresik	80	50	Rp. 1.500.000.000,-	Cang Muka & Pelunasan KPR
33	Tanah	Tanah	Jl. Mangrove, Klaten	Surabaya Barat	0	0	Rp. 1.500.000.000,-	Angsuran & Tunai

Figure 5. Product Data Page

NO	NAMA	ALAMAT	NO. HP
1	Wahid	Jalan Bukit Indah Timur	08123456789
2	Nani	Jalan Melati Indah Timur	08123456789
3	Yeni	Jl. Melati Indah Timur No. 25	0
10	Maria Aida	Jl. Mangrove No. 34, Surabaya	0
11	Aida	0	023456789
12	Tara	Jl. Braga	08123456789

Figure 6. Customer Member Data Page

NO	NAMA	TANGGAL	PERIOD	JENIS	ALAMAT	LOKASI	L1	L2	HARGA JUAL	CARA BAYAR
2	Nani	2018-01-09	22-40-46	Rumahnya	Jalan Cendekia Utama	Surabaya Pusat	80	50	Rp. 300.000.000,-	Angsuran & Tunai
2	Nani	2018-01-09	21-30-35	Ruko	Jalan Cendekia Utama	Surabaya Barat	80	60	Rp. 1.200.000.000,-	Cang Muka & Pelunasan KPR
5	Maria Aida	2018-01-01	52-44-36	Apartment	Jl. Jendral	Surabaya Timur	0	40	Rp. 300.000.000,-	Cang Muka & Pelunasan KPR
8	Andreas	2018-01-09	21-31-46	Tanah	Jl. Sateja	Gresik	300	0	Rp. 1.000.000.000,-	KPR Bank
10	Maria Aida	2018-01-01	20-25-45	Tanah	Jl. Braga	Surabaya Barat	0	0	Rp. 300.000.000,-	KPR Bank
1	Wahid	2018-01-09	21-28-45	Apartment	Jl. Diponegoro	Surabaya Utara	0	40	Rp. 200.000.000,-	KPR Bank

Figure 7. Follow Up Data Page

##### B. White Box Testing

White box testing is the testing stage that focuses on the details of procedures and the logic of the program code. In this stage, the system will be tested and compared with manual testing.

Table 21. Follow-Up Test Data

Follow Up Data			
No.	Criteria	SubCriteria	Score
1.	Jenis Properti	Primary	7
		Secondary	0
2.	Lokasi Properti	Dalam Kota	5
		Luar Kota	0
3.	Luas Properti	Luas Tanah	6
		Bangunan	8
4.	Harga Jual Properti	Diskon	0
		Non Diskon	6
5.	Cara Bayar Properti	Cicilan	2
		Tunai	0
6.	Fasilitas Properti	Utilitas	5
		Umum	16

Table 21 presents the follow-up test data used as input for the Profile Matching calculation during system evaluation. Each row contains criteria and subcriteria values provided by customer follow-up results, representing the customer's specific needs and preferences. These values serve as the reference profile that will be compared against product data to determine suitability scores. The table plays a crucial role in ensuring that the recommendation system can accurately match customer requirements with the most appropriate property alternatives.

Table 22. Product Sample Data

Product Data				
No.	Product	Criteria	Subcriteria	Score
1.	Pelican Hills	Jenis Properti	Primary	7
		Lokasi Properti	Secondary	0
			Dalam Kota	0
		Luas Properti	Luar Kota	3
			Luas Tanah	6
			Bangunan	7

Product Data				
No.	Product	Criteria	Subcriteria	Score
2.	Educity Standfort	Harga	Diskon	0
		Jual	Non	3
		Properti	Diskon	
		Cara	Cicilan	2
		Bayar	Tunai	0
		Properti		
		Fasilitas	Utilitas	5
		Properti	Umum	14
		Jenis	Primary	6
		Properti	Secondary	0
		Lokasi	Dalam	3
		Properti	Kota	
			Luar Kota	0
		Luas	Luas	0
		Properti	Tanah	
			Luas	8
			Bangunan	
		Harga	Diskon	0
		Jual	Non	7
		Properti	Diskon	
		Cara	Cicilan	3
		Bayar	Tunai	0
		Properti		
		Fasilitas	Utilitas	4
		Properti	Umum	14
3.	Perak Shophouse	Jenis	Primary	5
		Properti	Secondary	0
		Lokasi	Dalam	4
		Properti	Kota	
			Luar Kota	0
		Luas	Luas	7
		Properti	Tanah	
			Luas	6
			Bangunan	
		Harga	Diskon	0
		Jual	Non	3
		Properti	Diskon	
		Cara	Cicilan	0
		Bayar	Tunai	1
		Properti		
		Fasilitas	Utilitas	5
		Properti	Umum	12
		Jenis	Primary	4
		Properti	Secondary	0
		Lokasi	Dalam	2
		Properti	Kota	
			Luar Kota	0
		Luas	Luas	2
		Properti	Tanah	
			Luas	0
			Bangunan	
4.	Kavling Gayungsari	Harga	Diskon	0
		Jual	Non	3
		Properti	Diskon	
		Cara	Cicilan	2
		Bayar	Tunai	2
		Properti		
		Fasilitas	Utilitas	2
		Properti	Umum	12
		Jenis	Primary	3
5.	Pegudangan	Jenis	Primary	3

Product Data				
No.	Product	Criteria	Subcriteria	Score
	Margomulyo Permai	Properti	Secondary	0
		Lokasi	Dalam	1
		Properti	Kota	
			Luar Kota	0
		Luas	Luas	2
		Properti	Tanah	
			Luas	2
			Bangunan	
		Harga	Diskon	0
		Jual	Non	1
		Properti	Diskon	
		Cara	Cicilan	2
		Bayar	Tunai	0
		Properti		
		Fasilitas	Utilitas	5
		Properti	Umum	14
6.	Puncak Merr	Jenis	Primary	6
		Properti	Secondary	0
		Lokasi	Dalam	3
		Properti	Kota	
			Luar Kota	0
		Luas	Luas	0
		Properti	Tanah	
			Luas	8
			Bangunan	
		Harga	Diskon	0
		Jual	Non	6
		Properti	Diskon	
		Cara	Cicilan	0
		Bayar	Tunai	1
		Properti		
		Fasilitas	Utilitas	6
		Properti	Umum	13
7.	Delta Regency	Jenis	Primary	0
		Properti	Secondary	7
		Lokasi	Dalam	0
		Properti	Kota	
			Luar Kota	4
		Luas	Luas	5
		Properti	Tanah	
			Luas	6
			Bangunan	
		Harga	Diskon	0
		Jual	Non	5
		Properti	Diskon	
		Cara	Cicilan	2
		Bayar	Tunai	0
		Properti		
		Fasilitas	Utilitas	5
		Properti	Umum	12
8.	Kavling Manyar	Jenis	Primary	0
		Properti	Secondary	4
		Lokasi	Dalam	0
		Properti	Kota	
			Luar Kota	3
		Luas	Luas	2
		Properti	Tanah	
			Luas	0
			Bangunan	
		Harga	Diskon	0



Product Data				
No.	Product	Criteria	Subcriteria	Score
	Jual Properti	Jual	Non Diskon	3
	Bayar Properti	Cara Cicilan	Tunai	0
	Fasilitas Properti	Utilitas Umum		2
				8

The calculation of the Profile Matching method can be seen in Table 23.

Table 23. Calculation Using The Profile Matching Method

No.	Product Name	GAP Value	Weighted GAP Value	Subcriteria Score $NCF = \left(\frac{\sum NC}{\sum IC}\right) \times 60\%$ $NSF = \left(\frac{\sum NC}{\sum IC}\right) \times 40\%$
1.	Pelican Hills	0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
		0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
		-5	4	$NCF = \left(\frac{4}{1}\right) \times 60\% = 2,4$
		3	6,5	$NSF = \left(\frac{6,5}{1}\right) \times 40\% = 2,6$
		0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
		-1	8	$NSF = \left(\frac{8}{1}\right) \times 40\% = 3,2$
		0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
		-3	6	$NSF = \left(\frac{6}{1}\right) \times 40\% = 2,4$
		0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
		0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
		0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
		-2	7	$NSF = \left(\frac{7}{1}\right) \times 40\% = 2,8$
2.	Educity	-1	8	$NCF = \left(\frac{8}{1}\right) \times 60\% = 4,8$

Standfort		$\left(\frac{8}{1}\right) \times 60\% = 4,8$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
-2	7	$NCF = \left(\frac{7}{1}\right) \times 60\% = 4,2$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
-6	3	$NCF = \left(\frac{3}{1}\right) \times 60\% = 1,8$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$
1	8,5	$NSF = \left(\frac{8,5}{1}\right) \times 40\% = 3,4$
1	8,5	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,1$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
-1	8	$NCF = \left(\frac{8}{1}\right) \times 60\% = 4,8$
-2	7	$NSF = \left(\frac{7}{1}\right) \times 40\% = 2,8$
-2	7	$NCF = \left(\frac{7}{1}\right) \times 60\% = 4,2$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
-1	8	$NCF = \left(\frac{8}{1}\right) \times 60\% = 4,8$
0	9	$NSF = \left(\frac{9}{1}\right) \times 40\% = 3,6$
1	8,5	$NCF = \left(\frac{8,5}{1}\right) \times 60\% = 5,1$
-2	7	$NSF = \left(\frac{7}{1}\right) \times 40\% = 2,8$
0	9	$NCF = \left(\frac{9}{1}\right) \times 60\% = 5,4$

3. Perak Shophouse

4.	Kavling Gayungsari	-3	6	5,4 NSF = $\left(\frac{6}{1}\right) \times 40\% =$ 2,4	6.	Puncak Merr	0	9	$\left(\frac{5}{1}\right) \times 60\% = 3$ NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		-2	7	NCF = $\left(\frac{7}{1}\right) \times 60\% =$ 4,2			-4	5	NCF = $\left(\frac{5}{1}\right) \times 60\% =$ 3
		1	8,5	NSF = $\left(\frac{8,5}{1}\right) \times 40\% =$ 3,4			-6	3	NSF = $\left(\frac{3}{1}\right) \times 40\% =$ 1,2
		0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4			0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4
		-4	5	NSF = $\left(\frac{5}{1}\right) \times 40\% = 2$			-5	5	NSF = $\left(\frac{5}{1}\right) \times 40\% =$ 1,6
		-3	6	NCF = $\left(\frac{6}{1}\right) \times 60\% =$ 3,6			0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4
		0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		-3	6	NCF = $\left(\frac{6}{1}\right) \times 60\% =$ 3,6			0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4
		0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6			-2	7	NSF = $\left(\frac{7}{1}\right) \times 40\% =$ 2,8
		-4	5	NCF = $\left(\frac{5}{1}\right) \times 60\% = 3$			-1	8	NCF = $\left(\frac{8}{1}\right) \times 60\% =$ 4,8
		-8	1	NSF = $\left(\frac{1}{1}\right) \times 40\% =$ 0,4			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4			-2	7	NCF = $\left(\frac{7}{1}\right) \times 60\% =$ 4,2
		-3	6	NSF = $\left(\frac{6}{1}\right) \times 40\% =$ 2,4			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4			-6	3	NCF = $\left(\frac{3}{1}\right) \times 60\% =$ 1,8
		0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		-3	6	NCF = $\left(\frac{6}{1}\right) \times 60\% =$ 3,6			0	9	NCF = $\left(\frac{9}{1}\right) \times 60\% =$ 5,4
5.	Pegudangan Margomulyo Permai	-4	5	NSF = $\left(\frac{5}{1}\right) \times 40\% = 2$			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		-4	5	NCF = $\left(\frac{5}{1}\right) \times 60\% = 3$			0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6
		0	9	NSF = $\left(\frac{9}{1}\right) \times 40\% =$ 3,6			-2	7	NCF = $\left(\frac{7}{1}\right) \times 60\% =$
		-4	5	NCF =					

7.	Delta Regency			<b>4,2</b>	
		1	8,5	$NSF = \left(\frac{8,5}{1}\right) \times 40\% =$	
				<b>3,4</b>	
		1	8,5	$NCF = \left(\frac{8,5}{1}\right) \times 60\% =$	
				<b>5,1</b>	
		-3	6	$NSF = \left(\frac{6}{1}\right) \times 40\% =$	
				<b>2,4</b>	
		-7	2	$NCF = \left(\frac{2}{1}\right) \times 60\% =$	
				<b>1,2</b>	
		7	2,5	$NSF = \left(\frac{2,5}{1}\right) \times 40\% =$	
				<b>1</b>	
		-5	4	$NCF = \left(\frac{4}{1}\right) \times 60\% =$	
				<b>2,4</b>	
		4	5,5	$NSF = \left(\frac{5,5}{1}\right) \times 40\% =$	
				<b>2,2</b>	
		-1	8	$NCF = \left(\frac{8}{1}\right) \times 60\% =$	
				<b>4,8</b>	
		-2	7	$NSF = \left(\frac{7}{1}\right) \times 40\% =$	
				<b>2,8</b>	
	</				

Table 24 shows the final ranking of property products generated by the recommendation system using the Profile Matching method. The product Educity Standfort achieved the highest final score, indicating it is the most suitable option according to the customer's needs. It is followed closely by Perak Shophouse and Pelican Hills, which also demonstrated strong alignment with the evaluation criteria. Products such as Kavling Manyar and Delta Regency ranked lower, reflecting larger gaps between their attributes and the customer's requirements. Overall, these results demonstrate that the system successfully differentiates property alternatives and provides clear, data-driven

recommendations to support marketing decision-making.

## 5. CONCLUSION

Based on the testing results and analysis discussed in the previous chapter, it can be concluded that the developed system is able to manage property product data, customer member data, and follow-up data properly. Next, marketing Associates can obtain product recommendation information directly without having to manually match the existing data. Last, the system is capable of generating reports that can be used as analysis material to improve existing strategies.

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