



RFM Segmentation and K–Means Clustering of Skincare Product (Case study Scarlett)

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Abstrak– Analisis ini berfokus pada konsumen yang berisiko dalam pasar perawatan kulit, menggunakan metode segmentasi RFM. Metode ini melibatkan pengumpulan data pembelian konsumen yang mencakup waktu pembelian terbaru (Recency), frekuensi pembelian (Frequency), dan jumlah uang yang dibelanjakan (Monetary). Data dikumpulkan melalui sistem manajemen hubungan pelanggan (CRM) yang mencatat aktivitas pembelian konsumen. Alat analisis yang digunakan termasuk perangkat lunak statistik seperti SPSS atau Python dengan pustaka seperti pandas dan scikit-learn untuk pemrosesan data dan analisis kluster. Proses segmentasi melibatkan beberapa langkah spesifik: pengumpulan data dari CRM, pembersihan dan normalisasi data, penerapan algoritma RFM untuk mengelompokkan konsumen berdasarkan skor RFM mereka, serta analisis hasil segmentasi untuk mengidentifikasi karakteristik unik setiap segmen. Temuan ini mengungkapkan preferensi yang jelas untuk produk perawatan kulit di antara segmen ini, yang ditandai dengan waktu pembelian terbaru dalam 3 bulan, frekuensi pembelian sekitar 2 kali dalam periode tersebut, dan pengeluaran rata-rata sebesar Rp. 500.000. Diklasifikasikan dalam kelompok pembeli atas, pembeli yang berisiko ini menunjukkan karakteristik unik—terutama perempuan, bekerja di sektor swasta, dan tinggal di luar Jakarta, dengan rata-rata usia 31 tahun dan pendapatan Rp15 juta. Menanggapi wawasan ini, strategi 7P yang komprehensif di TikTok diusulkan untuk secara efektif melibatkan pembeli yang berisiko yaitu yang jarang membeli dan anggaran belanjanya rendah. Strategi ini mencakup penawaran produk yang disesuaikan, penetapan harga yang kompetitif, pemanfaatan platform yang strategis, kolaborasi dengan influencer, proses pembelian yang efisien, dan bukti nyata yang menunjukkan efektivitas produk. Evaluasi rutin ditekankan untuk memastikan adaptabilitas strategi dan efektivitas yang terus-menerus dalam memenuhi kebutuhan pembeli yang berisiko, yang pada akhirnya menumbuhkan loyalitas dan kepuasan merek dalam pasar perawatan kulit yang kompetitif..

Kata Kunci: Segmentasi RFM, Produk Perawatan Kulit, Bauran Pemasaran

Abstract– This analysis focuses on at-risk consumers in the skincare market using the RFM segmentation method. This method involves collecting consumer purchase data, including the recency of their last purchase, the frequency of their purchases, and the amount spent. The data is collected through a customer relationship management (CRM) system that records consumer purchase activities. Analytical tools like SPSS or Python with libraries such as pandas and scikit-learn are used for data processing and cluster analysis. The segmentation process involves several steps: collecting data from the CRM, cleaning and normalizing the data, applying the RFM algorithm to group consumers based on their RFM scores, and analyzing the segmentation results to identify the unique characteristics of each segment. The findings reveal clear preferences for skincare products among this segment, characterized by recent purchases within the last three months, a purchase frequency of about twice during that period, and an average spending of Rp. 500,000. Classified as top-tier buyers, these at-risk consumers exhibit unique characteristics—primarily females, working in the private sector, living outside Jakarta, with an average age of 31 years and an income of Rp. 15 million. In response to these insights, a comprehensive 7P strategy on TikTok is proposed to effectively engage at-risk buyers. This strategy includes customized product offerings, competitive pricing, strategic platform utilization, influencer collaborations, efficient purchasing processes, and tangible proof of product effectiveness. Regular evaluations are emphasized to ensure the adaptability and continuous effectiveness of the strategy in meeting the evolving needs of at-risk buyers, ultimately fostering brand loyalty and satisfaction in the competitive skincare market.

Keywords: RFM Segmentation, Skincare Product, Marketing Mix

I. INTRODUCTION

The prevailing challenge in the corporate landscape is intense business competition, prompting organizations to focus on effective marketing strategies, sound policies, acquiring new customers, and retaining existing ones [1]. Prioritizing customer satisfaction is paramount, aligning with strategies that yield both customer contentment and profitable returns on investment.[2] Recognizing customers as vital assets crucial for organizational sustainability, adept customer management significantly influences the company's revenue.[3] Customers play a pivotal role in determining the success or failure of a

business organization, as the very existence of a business hinges on its ability to attract and retain a customer base.[4]

Conducting maintenance for customers holds significant importance, not only in acquiring new customers but also in retaining existing ones. Many companies face customer attrition due to their inability to uphold good service levels.[5] Incorrectly devising marketing strategies pertaining to customer retention is a key factor contributing to customer losses.[6] To address this challenge and support the company's strategic goals for customer development, profiling and segmentation of customer data become crucial. The widely employed

analytical method for such purposes is RFM (Recency, Frequency, Monetary), which analyzes customer behavior based on transaction history—considering the recency of transactions, frequency, and monetary value. This method aims to provide recommendations for business strategies.[7]

However, implementing segmentation and profiling based on customer behavior from extensive databases, especially for diverse marketing and sales goals using the RFM analysis method, poses challenges for companies.[8] This research focuses on a skincare company in Indonesia, specifically Scarlett Shop, employing the RFM analysis method combined with demographic factors such as Age, Location, Gender, Income, and purchase frequency (referred to as RFM).[9] Scarlett Shop was selected as the object of study because, in the skincare industry, there is a gap in utilizing an effective data analysis model for informing business strategies based on customer data. RFM segmentation and K-Means clustering are popular techniques for customer segmentation, especially in industries like skincare. RFM (Recency, Frequency, Monetary) analysis involves evaluating customers based on the recency of their last purchase, the frequency of their purchases, and the monetary value of their transactions. By assigning scores to these metrics, businesses can classify customers into different segments based on their purchasing behavior. K-Means clustering is an unsupervised machine learning algorithm used to group similar data points into clusters. For customer segmentation, it involves defining the number of clusters (k) and assigning each customer to the nearest cluster based on their RFM scores. This method helps in identifying distinct customer groups with similar buying behaviors, enabling more targeted marketing strategies.[10]

To apply these methods effectively, start with data collection and preparation by gathering transaction data, including purchase dates, frequency, and amounts spent by each customer. Next, clean and normalize the data by handling missing values and outliers, ensuring consistent scaling across features. Calculate RFM scores by assigning values for recency, frequency, and monetary metrics, where higher scores indicate better engagement. Then, determine the optimal number of clusters using the elbow method, which involves plotting the within-cluster sum of squares (WCSS) against the number of clusters. Apply the K-Means algorithm to segment customers into the identified clusters. These clusters can reveal insights such as high-value customers who purchase frequently and recently, or at-risk customers who haven't purchased recently but have a high spending history. These insights are invaluable for crafting personalized marketing strategies and improving customer retention [11]

Data mining is a highly prevalent method for extracting information from vast datasets, providing substantial assistance in various areas, including customer segmentation and profiling.[12] It is crucial to adopt an effective analytical model for successfully segmenting and profiling customers. Utilizing techniques like clustering

and classification proves to be a valuable approach in achieving this goal.

II. METHODOLOGY

This research uses a quantitative research methodology approach using RFM (Recency, Frequency, Monetary) and Clustering Analysis. RFM analysis is a customer segmentation method used to understand customer behavior in the marketing context.[13] This method breaks down customer behavior into three key dimensions: Recency, Frequency, and Monetary. Recency measures how recent a customer made a transaction, Frequency measures how often they interact with the business, while Monetary assesses how much money the customer spent.[14]

In the RFM analysis process, the first step is to collect customer transaction data, including transaction timestamps, purchase frequency, and transaction values. For each customer, Recency, Frequency, and Monetary values are then calculated based on this data. These values provide a comprehensive overview of how active and valuable each customer is to the business. To gain deeper and more actionable insights, combining RFM analysis with clustering techniques is often beneficial. Clustering allows grouping customers with similar characteristics into more defined segments. Clustering algorithms, such as K-Means or Hierarchical Clustering, can be applied using RFM values as input features.

The clustering process results in customer segments exhibiting similar purchasing patterns. For instance, a cluster of customers with high Recency, low Frequency, and low Monetary values might indicate recently engaged but infrequent and low-spending customers. Understanding the characteristics of each customer segment enables businesses to take specific actions to meet the needs and preferences of each group.[15] This allows companies to design more targeted marketing strategies, create more relevant offers, and enhance customer retention by providing personalized and meaningful experiences.[16] Therefore, the combination of RFM analysis and clustering provides a holistic and structured approach to understanding and responding to the unique behaviors of customers. It enables companies to more effectively allocate their marketing resources and improve overall customer value, as can be seen in table 1, and 3 below.

Table 1. Grade of Recency

Grade	Recency
1	3 Month
2	2 Months
3	1 Months

Table 1. Grade of Frequency

1	< 2
2	2
3	3
4	4

Table 2. Money Spend

Grade	Recency
1	< 300.000
2	< 400.000
3	< 500.000
4	> 500.000

The approach taken for data collection included the use of a Google Form questionnaire distributed among respondents selected through random sampling. From a total population of 10,000 individuals, a representative sample of 1%, consisting of 100 respondents, was selected. After collecting the survey responses, they were structured and inputted into an RFM table. This table underwent thorough scrutiny to determine how individuals were distributed among various categories or grades outlined within the RFM framework.

III. RESULT AND DISCUSSION

The insights provided within the RFM segmentation table can be better understood by referencing tables 2, 3, and 4. These supplementary tables offer a more comprehensive comprehension of the data points outlined in the RFM table. The figures presented at the intersection of rows and columns in these tables represent the total count of individuals or participants categorized within the specific grade under discussion.

Table 4. RFM Segmentation

R	F	M			
		1	2	3	4
1	1	-	-	-	-
	2	-	9	-	-
	3	-	-	67	-
	4	-	-	-	-
2	1	-	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	23
3	1	-	-	-	-
	2	-	-	-	-
	3	-	-	-	-
	4	-	-	-	-

After analyzing the RFM segmentation methods displayed in the chart above, it becomes evident that the at-risk consumers exhibit a preference for skincare products with a spending recency of 3 months. Their spending behavior during this timeframe indicates a frequency of purchases, typically ranging from 2 times within that three-month cycle. On average, these customers spend Rp. 500,000 per basket over a 3-month period on skincare products and the class is included in the upper buyer cluster or we can call it an at-risk buyer.

In the Upper Buyer or At-risk buyer segmentation class, they fall into cluster 1 characterized by a female-dominant demographic, including both married and single individuals. The majority of them are employed in the private sector. They became acquainted with Scarlett

through the TikTok platform. It can be noted that this class is predominantly comprised of individuals residing outside Jakarta. With an average age of 31 years and an average income of Rp15 million, this group embodies the distinctive features associated with cluster 1.

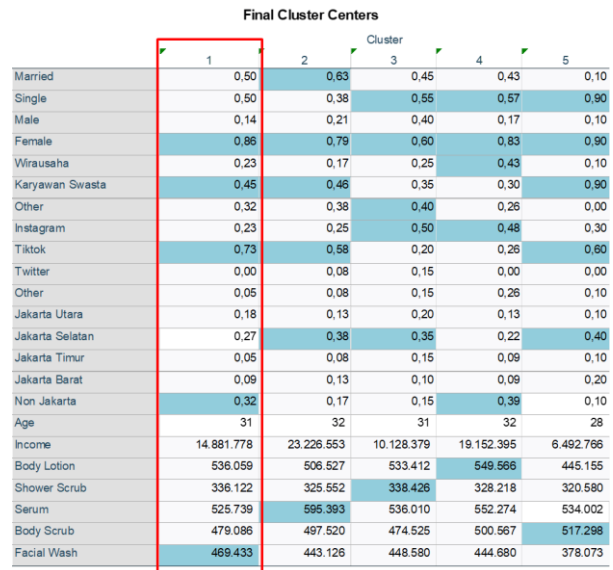


Image 1. Clustering of Customer

In formulating a comprehensive 7P strategy on TikTok to engage at-risk buyers in the skincare market, a strategic approach is imperative. Firstly, the product aspect involves tailoring skincare offerings to specifically address the unique needs of at-risk buyers, potentially introducing specialized products that cater to their specific skin conditions. In terms of pricing, implementing competitive yet value-driven pricing is crucial, with the integration of limited-time discounts, bundle deals, or exclusive promotions on TikTok to appeal to at-risk buyers and address any cost-related concerns. Utilizing TikTok as the primary platform (place) is paramount. Collaborating with influencers and crafting engaging content that showcases the skincare products is essential. TikTok's advertising features should be harnessed to ensure that the content reaches the intended audience effectively. A focus on promotional activities through influencer marketing, sponsored content, and hashtag challenges will enhance brand visibility and stimulate user engagement, particularly by emphasizing time-sensitive promotions that create a sense of urgency.

The people aspect involves leveraging influencers and content creators on TikTok who wield influence over the at-risk buyer segment.[17] These individuals can provide authentic testimonials, product demonstrations, and relatable content, fostering a personal connection and building trust with potential buyers. Streamlining the purchasing process (process) is crucial, with a seamless transition from TikTok to the e-commerce platform. A user-friendly checkout process with secure payment options ensures a hassle-free experience for at-risk buyers.

Physical evidence is showcased through TikTok by sharing tangible proof of product effectiveness. This includes before-and-after visuals, user testimonials, and reviews from individuals within the at-risk buyer segment, creating a library of content that serves as concrete evidence of the positive impact of skincare products. Regular evaluation of the strategy's performance is essential to make necessary adjustments and maintain relevance and effectiveness in engaging at-risk buyers on TikTok.

IV. CONCLUSION

In conclusion, the analysis of at-risk buyers using RFM segmentation reveals their preference for skincare products, particularly with a spending recency of 3 months, an average frequency of 2 purchases, and a basket spend of Rp. 500,000. This group, part of the upper buyer cluster, is characterized by a female-dominant demographic outside Jakarta, introduced to skincare through TikTok and Scarlett's influence.

To engage this segment on TikTok, a concise 7P strategy is proposed. It focuses on tailored products, competitive pricing, strategic platform use, influencer collaboration, streamlined purchasing, and showcasing product effectiveness. Regular evaluation and adjustments are crucial for adapting to changing preferences and market dynamics, ensuring sustained success in the competitive skincare industry.

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