RFM MODEL ANALYSIS TO INCREASE MERCHANT RETENTION IN PAYMENT GATEWAY COMPANIES. CASE STUDY: PT F-PAY

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ABSTRACT

This research aims to provide an in-depth understanding of customer performance and behavior in merchant payment gateway transactions through Recency, Frequency and Monetary (RFM) analysis. In the results of this analysis, the Top Merchant segment achieved the highest performance, representing 11% of total transactions. High Value Merchants, covering 9% of the total, showed good performance. Medium Value Merchant, 20% of the total, represents a good balance. The Low Value Merchant segment, accounting for 29% of the total, showed lower performance with lower Recency, Frequency and Monetary, requiring special efforts to increase transaction value or purchase frequency. Lost Merchants, at 32% of the total, had the lowest performance. RFM analysis provides valuable strategic insight to improve marketing effectiveness and merchant retention on merchant payment gateway transactions. Top Merchants, with the highest performance in all RFM dimensions, are the focus of marketing strategies to increase transaction value and customer retention. The proposed recommendations include launching exclusive loyalty programs, personalizing marketing content, up-to-date information, exclusive events, collaboration strategies with influencers, ongoing customer evaluation, and identifying cross-selling and up-selling opportunities. It is hoped that this strategy can strengthen relationships with Top Merchant customers, maximize transaction value, and achieve high customer retention

Keywords: *Recency Frequency Monetary (RFM), Merchant Retention, Payment Gateway.*

ABSTRAK

Penelitian ini bertujuan untuk memberikan pemahaman mendalam tentang kinerja dan perilaku pelanggan dalam transaksi gateway pembayaran merchant melalui analisis Recency, Frekuensi dan Moneter (RFM). Hasil analisis tersebut, segmen Top Merchant meraih kinerja tertinggi yaitu mewakili 11% dari total transaksi. Pedagang Bernilai Tinggi, yang mencakup 9% dari total, menunjukkan kinerja yang baik. Pedagang Nilai Menengah, 20% dari total, mewakili keseimbangan yang baik. Segmen Pedagang Bernilai Rendah, yang mencakup 29% dari total, menunjukkan kinerja yang lebih rendah dengan Keterkinian, Frekuensi, dan Moneter yang lebih rendah,

sehingga memerlukan upaya khusus untuk meningkatkan nilai transaksi atau frekuensi pembelian. Pedagang yang Hilang, sebesar 32% dari total, memiliki kinerja terendah. Analisis RFM memberikan wawasan strategis yang berharga untuk meningkatkan efektivitas pemasaran dan retensi pedagang pada transaksi gateway pembayaran pedagang. Top Merchants, dengan kinerja tertinggi di seluruh dimensi RFM, menjadi fokus strategi pemasaran untuk meningkatkan nilai transaksi dan retensi pelanggan. Rekomendasi yang diusulkan antara lain meluncurkan program loyalitas eksklusif, personalisasi konten pemasaran, informasi terkini, acara eksklusif, strategi kolaborasi dengan influencer, evaluasi pelanggan berkelanjutan, dan mengidentifikasi peluang cross-selling dan up-selling. Strategi ini diharapkan dapat mempererat hubungan dengan pelanggan Top Merchant, memaksimalkan nilai transaksi, dan mencapai retensi pelanggan yang tinggi

Kata Kunci : Moneter Frekuensi Terkini (RFM), Retensi Pedagang, Gerbang Pembayaran.

INTRODUCTION

Payment Gateway is an electronic service that allows merchants to process payment transactions using payment instruments using cards, electronic money, and/or Proprietary Channels (Bank Indonesia, 2016). Simply put, a payment gateway is the gateway to an online transaction. Payment gateways allow you to receive funds from consumers through various payment options for your website such as through bank transfers, debit/credit cards, or retail outlets. Payment gateways make it easy to accept payments directly from your website. Payment gateways act as a mediator between transactions on your website and the payment processor. This is because information related to sales transactions should not be sent directly from your website to the payment processor for security reasons.

Customer retention, conventionally, can be defined as the number of customers who remain loyal to using a company's products or services at the end of a certain period, which is then expressed as a percentage of active customers at the beginning of the following period (Buttle, 2004). Simbolon (2011) provides another definition that emphasizes that customer retention reflects the low number of consumers who leave the company's products or services. Thus, customer retention becomes a strategic activity in which the company seeks to maintain customer loyalty, which can be measured by the number of customers who remain loyal at the beginning of the next period. Indicators of customer retention, according to Ratih (2008), involve several key aspects. The first is trust, which is reflected

in factors such as the security provided by the company, the convenience generated by services and products, and the customer's interest in the company's offerings. Next, customer satisfaction becomes an important factor, which is measured through the speed of service provided by the company and the friendliness and courtesy of employees. Finally, customer commitment is also a key indicator, which can be reflected in participation in periodic promo facilities, product purchases during promo periods, and overall customer care (Dwi Sri Wahyuni et al., 2022).

The rapid increase in the use of online payments has created new challenges and opportunities for payment service providers (Payment Gateway). By 2022, the total value of online payment transactions through payment gateways will reach around Rp2,000 trillion, an increase of 35% from the previous year. This data shows the high adoption of digital payments in various business sectors, such as e-commerce, travel, and other online services, which in turn drives the overall growth of the digital economy. Payment gateways also play an important role in supporting the growth of Micro, Small, and Medium Enterprises (MSMEs) in Indonesia. Data shows that around 80% of the total online payment transactions through payment gateways come from MSMEs. This shows that MSMEs are increasingly adopting online business models to expand their market reach and increase revenue. With an easily accessible and affordable payment gateway, MSMEs can optimize the use of technology in developing their business, thus positively impacting the overall growth of the digital economy (Media Indonesia, 2023).

In an increasingly digitalized business world, payment gateway companies like PT F-Pay face various challenges in increasing merchant retention. One of the main challenges is the intense competition among payment gateway service providers. To stay ahead, PT F-Pay must innovate and offer superior services to attract and retain merchants. Changing consumer behavior is also a challenge. As cashless payment habits increase, consumers now prefer to make payments digitally rather than using cash. PT F-Pay must continue to innovate and adapt its services to meet changing consumer preferences. Transaction security is a top priority for PT F-Pay.

Companies have to ensure that the transactions that run and are processed are secured, and this involves implementing various security systems such as data encryption and Secure Socket Layer (SSL). System integration was also a challenge. PT F-Pay had to ensure seamless integration with the various e-commerce platforms

used by merchants. This involves fast and secure transfer of information between the e-commerce application and the payment processing system Effective and responsive customer support and service is also critical for merchant retention. PT F-Pay must be able to handle merchant issues quickly and efficiently. Transaction fees are also an important consideration for merchants. PT F-Pay must offer a competitive fee structure without compromising profitability. Changing regulations and compliance with those regulations is also a challenge. PT F-Pay must ensure compliance with regulations from Bank Indonesia and the Ministry of Communication and Information. Finally, data analytics is a key challenge in improving merchant retention. PT F-Pay must understand and respond to merchant transaction behavior, which includes various aspects such as the last time the merchant made a transaction (recency), the number of transactions made by the merchant (frequency), and the total value of transactions made by the merchant (monetary). Understanding this transaction behavior is important to design a more personalized and effective retention strategy.

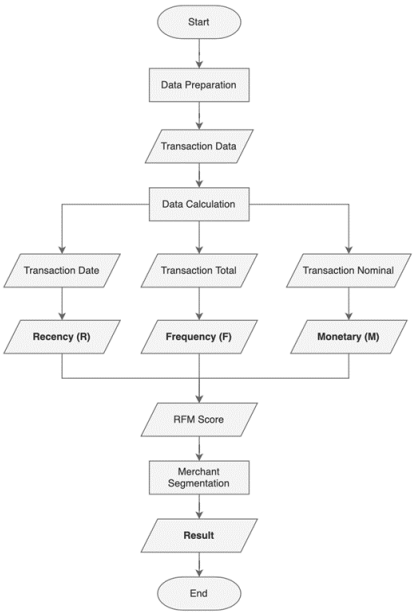
According to K. Tsiptsis and Chorianopoulos, RFM (Recency, Frequency, Monetary) analysis is a method used to measure customer value based on three main dimensions. The first is Recency, which assesses the time span (date, month, year) of the customer's last transaction to the present. The smaller the time span, the greater the Recency value, indicating that the customer has more recent interactions with the company. The second dimension is Frequency, which measures customer value based on the number of transactions made within a certain period of time. The more frequently a customer makes transactions, the greater the Frequency (F) value will be, reflecting the customer's high level of involvement in the company's business activities. Finally, Monetary is the third dimension that assesses customer value based on the amount of money spent by customers in a period. The greater the amount of money spent by the customer, the greater the Monetary (M) value, reflecting the significant financial contribution of the customer (Shaffira Atthariq, 2021).

By analyzing these three dimensions, companies can understand and identify which customers have high value and have the potential to have a positive impact on business performance. RFM analysis becomes a strategic tool in managing customer relationships and designing more targeted marketing strategies to maximize customer value. The application of the RFM model in payment gateway

companies, especially at PT F-Pay, has not been widely explored. This research aims to fill the gap by analyzing how the RFM model can be implemented to improve merchant retention at PT F-Pay. By understanding and responding to merchant transaction behavior, it is expected that PT F-Pay can increase merchant satisfaction and loyalty, which will ultimately contribute to the company's business growth and sustainability

RESEARCH METHOD

The RFM (Recency, Frequency, Monetary) model implementation methodology involves a series of systematic steps to identify and classify customers based on purchasing behavior. The following is the methodology for applying the RFM model to merchant payment transactions



Picture 2. Flowchart Methodology

Data Preparation:

The data to be analyzed in this study comes from the PT F-Pay merchant transaction data report from October - December 2023, including data on the time of transactions made by merchants, the number of transactions made by merchants, and data on when merchants made the last transaction. Merchant data totals 203 with a total of 30,562 transactions. To apply the RFM model to the transaction data from the payment gateway, the first step is to extract the relevant transaction information. The information includes the merchant ID, transaction date, transaction total and transaction amount. After that, the next step is to clean and process the data to ensure its quality. This process involves handling missing values, fixing inconsistencies, and if required, normalizing the data.

Calculate RFM Scores:

Calculating RFM Scores is an important step in applying the RFM model to merchant transaction data. RFM Scores combine Recency, Frequency, and Monetary values for each merchant, which will be calculated using Python, the results will provide a more holistic understanding of the contribution and purchasing behavior of each merchant. The following is an explanation of the calculation of Recency, Frequency, and Monetary.

- *Recency*: Calculates the number of

days since each merchant's last transaction. Lower values indicate activity that is more recent or occurred in a closer period of time.

- *Frequency*: Calculates the total number of transactions made by each merchant in the analysis period. Higher values indicate more frequent transactions.
- *Monetary*: Calculates the total amount of money processed by each merchant in the analysis period. A higher value indicates greater revenue or higher transaction value overall.

By analyzing these three dimensions (Recency, Frequency, Monetary) of transaction data, it is possible to better understand the buying behavior patterns of customers and provide a basis for grouping customers into specific segments, allowing for more informed decisions in marketing and customer service strategies.

Segment Merchants

Segmentation based on RFM Scores on merchant transactions opens up great opportunities to better understand customer buying behavior and improve the effectiveness of retention strategies. RFM Scores, which include Recency, Frequency, and Monetary Value, provide a holistic view of each merchant's contribution and engagement. By combining these scores, it can divide merchants into segments that have similar characteristics, allowing for more focused management. This segmentation can help PT F-Pay identify merchants that frequently transact with high value, new merchants that need attention, or merchants that may need to be reactivated. Below is the label segmentation based on RFM Score.

Table 1. RFM Score Segmenatation

RFM	Segment Label
Score > 4.5	Top Merchant
4 < Score < 4.5	High-value Merchant
3 < Score < 4	Medium Value Merchant
1.6 < Score < 3	Low-Value Merchant
Score < 1.6	Lost Merchant

Analyze and Action:

The RFM score results in an in-depth understanding of the characteristics and behavior of each Merchant segment. This level of analysis allows us to dig deeper into merchants' buying patterns, understanding the extent to which they contribute to transaction frequency and revenue. By formulating strategies tailored to the unique needs of each segment, retention efforts on

RFM score results are expected to provide a foundation for strategies to improve merchant retention, resulting in long-term benefits for both merchants and payment platforms.

RESULT AND DISCUSSION

Tabel 2. Hasil RFM

Merchant ID	Recency	Frequency	Monetary	R_rank_norm	F_rank_norm	M_rank_norm	R	F	M	RFM_Score	Merchant_segment
31706	0	17710	5877861108	100.00	100.00	100.00	5	4	5	5.00	Top Merchant
32805	0	2628	108744932	100.00	99.51	99.51	5	4	5	4.98	Top Merchant
31932	0	1553	934714723	100.00	99.03	99.03	5	4	5	4.96	Top Merchant
33843	0	1440	1950161258	100.00	98.54	98.54	5	4	5	4.94	Top Merchant
31746	0	1058	10810196	100.00	98.06	98.06	5	4	5	4.92	Top Merchant
...	...	...	...	...	...	...	...	...	...	...	...
34797	27	7	5138200	34.40	58.74	58.74	2	3	4	2.75	Low Value Merchant
35152	9	6	3946700	54.67	54.37	54.37	3	3	4	2.72	Low Value Merchant
35571	34	7	605000	27.73	58.74	58.74	2	3	2	2.70	Low Value Merchant
31956	4	5	1274000	68.27	50.24	50.24	4	2	3	2.65	Low Value Merchant
33721	0	4	320000	100.00	44.42	44.42	5	2	2	2.64	Low Value Merchant

The data provided is shown as Table 2 which is derived from the RFM (Recency, Frequency, Monetary) analysis results for a number of merchants. Below is the explanation for each column:

1. **Merchant ID:** Unique identification for each merchant.
2. **Recency:** Indicates the last time the customer made a transaction with the merchant. Expressed in a specific unit of time (day or month).
3. **Frequency:** The total number of transactions made by the customer with the merchant.
4. **Monetary:** The total value of money spent by customers on transactions with merchants.
5. **R_rank_norm, F_rank_norm, M_rank_norm:** The normalized percentile value of Recency, Frequency, and Monetary. Measured on a scale of 0 to 100, where 100 indicates the highest value.
6. **R, F, M:** Category scores (Recency, Frequency, Monetary) that represent the merchant's performance in each dimension. Given on a scale of 1 to 5, with 5 indicating the best category.
7. **RFM_Score:** An overall score that is the aggregated result of R, F, and M. It is usually used to give an overall value to customer performance.
8. **Merchant_segment:** Merchant segmentation categories based on RFM Score. For example, "Top Merchant" for merchants with high scores, and "Low Value Merchant" for merchants with low scores.

For example, in the first row, Merchant ID 31706 has high Recency, Frequency, and Monetary, expressed by the values of R Rank, F Rank, and M Rank which are all 100, so the merchant belongs to the "Top Merchant" category. Conversely, in the last row, Merchant ID 33721 has low scores in all categories, so it falls into the "Low Value Merchant" category. This data can be used to segment customers based on their transaction behavior, helping companies identify and focus on merchants with higher profit potential

Table 3. RFM Statistical Result

	Recency			Frequency			Monetary		
	mean	count	max	mean	count	max	mean	count	max
Merchant_segment									
High value Merchant	1.277778	18	6	59.944444	18	134	3.805604e+07	18	353793830
Lost Merchant	45.484375	64	89	1.312500	64	2	1.064974e+06	64	13500000
Low Value Merchant	21.293103	58	63	4.431034	58	8	2.220912e+06	58	13454000
Medium Value Merchant	4.250000	40	19	17.850000	40	34	1.059271e+07	40	67999994
Top Merchant	0.086957	23	1	1377.826087	23	17710	2.423193e+09	23	41613999106

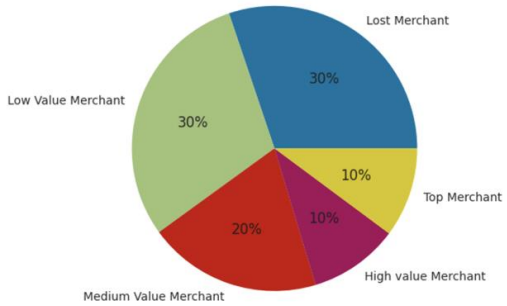
In the context of the RFM analysis results in Table 3 for each merchant category, the terms "mean," "count," and "max" have the following meanings:

1. ***Mean*:**
   - It is the average value of a metric (Recency, Frequency, or Monetary) within a particular merchant category.
   - Calculated by summing up all the metric values for each merchant in the category and then dividing it by the number of merchants in the category.

2. ***Count*:**
   - Represents the total number of merchants that fall under a particular category.
   - Provides information on how large a sample of data is used to calculate average and other values.

3. ***Max*:**
   - Represents the highest value of a metric (Recency, Frequency, or Monetary) in a particular merchant category.
   - Represents the best performing merchant in the dimension in question within the category.

RFM analysis results show that Top Merchant has very low Recency (0.08) with very high Frequency (1377.8) and large Monetary (242 million), characterizing high performance in all RFM dimensions. Meanwhile, Lost Merchants show high Recency (45.48) with low Frequency and Monetary, possibly requiring reactivation efforts. High Value Merchants show good performance with low Recency (1.2), high Frequency (59.9), and large Monetary (1 million), while Low Value Merchants show lower performance with medium Recency (21.02), lower Frequency and Monetary



Picture 2. Chart Merchant Segmentation

Segmentation based on RFM results provides an overview of the distribution of merchants in certain categories based on RFM values. The following is an explanation of the segmentation chart results:

1. **Top Merchant (11%):**
   - This is the top segment with the highest RFM Score.

- Merchants in this segment have high performance in terms of Recency, Frequency, and Monetary.
- These are merchants who have recently transacted, transact frequently, and spend significant amounts of money.

2. **High Value Merchant (9%):**
   - This segment has a high RFM value, but not as good as the Top Merchant segment.
   - Has high performance in one or two dimensions (Recency, Frequency, or Monetary).
3. **Medium Value Merchant (20%):**
   - Is a segment with a medium RFM value.
   - Has a balance between Recency, Frequency, and Monetary which contributes quite well.
4. **Low Value Merchant (29%):**
   - This segment has a low RFM value, indicating that the customer's performance in their transaction is not optimal.
5. **Lost Merchant (32%):**
   - This is the lowest performing segment.
   - Includes merchants who have not transacted in a long time (low Recency), or low transaction frequency and value.

By understanding this distribution, companies can design appropriate marketing strategies for each segment. For example, efforts may be focused on customer retention within the Top Merchant and High Value Merchant segments, while other strategies may be needed to generate interest from customers within the Low Value Merchant and Lost Merchant segments

CONCLUSION AND RECOMMENDATION

Based on RFM (Recency, Frequency, and Monetary) analysis on PT F-Pay's merchant transaction data provides an overview of the performance and behavior of merchants in payment gateway companies. From this analysis, five main merchant segments emerged, namely Top Merchant, High Value Merchant, Medium Value Merchant, Low Value Merchant, and Lost Merchant. Top Merchants are the highest performing segment in all RFM dimensions. They have low Recency, high Frequency, and large Monetary, indicating the latest and most frequent interactions with high transaction values. Hence, they are the primary focus for marketing strategies aimed at maintaining and increasing transaction value. High Value

Merchants, while not as good as Top Merchants, still perform well with high RFM values. Medium Value Merchant shows a balance between Recency, Frequency, and Monetary. Low Value Merchant has a lower performance, with medium Recency, Frequency, and lower Monetary. Lost Merchant is the lowest-performing segment, which includes customers who have not transacted for a long time or have low transaction frequency and value

REFERENCES

Arda, Edvidel. (2024, Januari 04). *Analysis Of Factors Influencing The Performance Of Payakumbuh City Public Housing And Residential Area Employees Using Binary Logistic Regression*. https://jurnal.ittc.web.id/index.php/jebd/article/view/547/493

Bank Indonesia. (2016, November 9). *PERATURAN BANK INDONESIA NOMOR 18/40/PBI/2016 TENTANG PENYELENGGARAAN PEMROSESAN TRANSAKSI PEMBAYARAN DENGAN RAHMAT TUHAN YANG*. Bank Indonesia. Retrieved December 20, 2023, from https://www.bi.go.id/id/publikasi/peraturan/Documents/PBI_184016.pdf

Dwi Sri Wahyuni, Erry Sunarya, & Nor Norisanti. (2022). ANALISIS RETENSI PELANGGAN DAN SWITCHING COSTS TERHADAP LOYALITAS PELANGGAN INDIHOME. *Journal of Management and Bussines (JOMB)*, *Volume 4, Nomor 1, Januari-Juni 2022*, 99-107.

Media Indonesia. (2023, June 28). *Peran Payment Gateway Meningkat, Ini 5 Pilihan Gateway Terbaik*. Media Indonesia. Retrieved December 6, 2023, from https://mediaindonesia.com/teknologi/592805/peran-payment-gateway-meningkat-ini-5-pilihan-gateway-terbaik

Shaffira Atthariq, A. (2021, Juni 10). *KLASIFIKASI CUSTOMER CHURN BERDASARKAN SEGMENTASI PELANGGAN MENGGUNAKAN ALGORITMA NAÏVE BAYES (STUDI KASUS : ESL EXPRESS TASIKMALAYA)*. http://repositori.unsil.ac.id/id/eprint/2513