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A Predictive CRM Analytics Framework For Merchant Retention: Applying RFM Segmentation, Customer Profiling, and Behavioral Analytics In The B2B Payment Gateway Company

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ABSTRACT

The history of payment systems, especially in the digital world, tells an engaging story of technological breakthroughs, economic growth, and shifts in society. The purpose of this study is to find out a Predictive CRM analytics framework for merchant retention: integrating RFM Segmentation, customer profiling, and dynamic insights in the B2B payment gateway company. This research outlines the research methodology, which links the theoretical concepts discussed earlier with the empirical evidence to be analyzed. Result diverse merchant base, spanning enterprises and SMEs across a wide range of industries, presents a unique set of challenges for retention. With over 50,000 merchants active and a complex landscape of transaction patterns and payment preferences, a one-size-fits-all approach is insufficient. A robust, adaptive, and data-driven framework is essential to effectively address these challenges and drive long-term merchant loyalty. The conclusion is This comprehensive analysis of the merchant base through the lens of enriched RFM segmentation, transactional trends, payment preferences, and CLV reveals a dynamic and nuanced landscape.

Keywords : CRM, digital payment, RFM

INTRODUCTION

The history of payment systems, especially in the digital world, tells an engaging story of technological breakthroughs, economic growth, and shifts in society. Originally, trading involved a simple barter system where goods were exchanged directly. However, as societies developed and became more complex, this makes the limitations of this system become increasingly clear. Transitioning to physical currency, from coins to paper money, represented a major advancement that simplified transactions and broadened trade possibilities (Choudhury & Harrigan, 2014). Yet, the true revolution in payment systems started with the rise of the internet. Digital payments, a major innovation, allowed for transactions to span great distances without the need for physical money. At the heart of this digital shift is the 'payment gateway,' a technology that ensures online transactions are secure by encrypting and transferring payment information between the customer and the merchant. This technology not only makes the payment process more efficient but also crucially helps keep online transactions secure, safeguarding against fraud and unauthorized entries. (Chircu, 2015) (Hisyam & Manuaba, 2022)

This evolution has also been driven by various innovations that had developed previously. For example, Pioneering companies like PayPal has modernized online payments by introducing secure payment gateways that emphasized speed, ease of use, and enhanced security. Similarly, The emergence of mobile payments, offered by services like Apple Pay and Google Wallet, has further changed the payment landscape. Collectively, these advancements, which also supported by the widespread use of

smartphones, are steering us towards a society that increasingly relies on cashless transactions.

Figure 1 : Favorite Payment Method In Indonesia. Source Image By Tim Shopback Dota. The survey was conducted on 2,025 respondents throughout Indonesia on March 8-10, 2021

In Indonesia, the digital payment evolution mirrors global trends while also showcasing unique regional characteristics. The country's journey from SMS Banking to sophisticated platforms like M-Banking and Internet Banking illustrates a dynamic financial technology landscape. Particularly noteworthy are the e-Money and e-Wallet services, which have gained immense popularity. These platforms offer the flexibility of digital transactions without direct bank involvement, appealing to a wide range of users (Hallikainen, Savimäki, & Laukkanen, 2020). This shift in Indonesian consumer behavior towards preferring cashless payments mirrors a global trend, a shift that the COVID-19 pandemic has only accelerated, emphasizing the role of digital payments in maintaining economic stability. In Indonesia, as elsewhere, the pandemic has made digital payments not just popular, but essential, playing a crucial role in keeping businesses running and supporting health measures. Research has shown that knowledge, security, convenience, and trust significantly influence the adoption and use of financial technology systems, especially online-based payments, during this period (Iskandar & Alim, 2023; Iskandar & Tanjung, 2023).

DOKU, a leading digital payment provider in Indonesia, exemplifies the impact of these advancements. Starting in 2007, DOKU pioneered a digital transactional system in a conventional era, facing the immense challenge of introducing a new concept in the progressing industry. The company's vision is to realize changes that will drive rapid growth in payment systems. To achieve this vision requires not only the right processes but also the right partners, making trust the foundation of DOKU's journey for more than a decade (Harrigan, Ramsey, & Ibbotson, 2011). The company has continually prioritized the security of business partners' transactions, designing its own risk mitigation system to ensure seamless processing and protection against threats and frauds. DOKU's product innovation has matured its system and experiences, driving the progress of the ecosystem from B2B payment solutions for Corporates national and international to facilitating payment system and also international fund transfers, significantly contributing to Indonesia's economic growth.

Global and Local Context

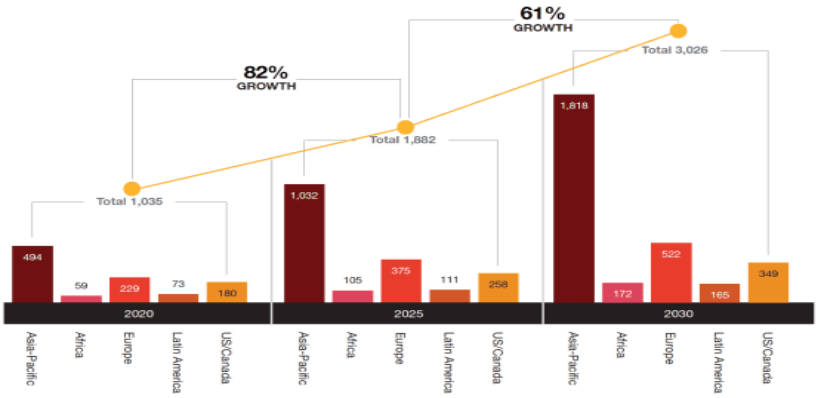

Figure 2 : Cashless Transaction Volume Will More Than Double By 2030. Source Image By Pwc Strategy & Global Payments Model, 2021

In this digital era, the global business environment, especially in the financial sector, has experienced significant transformation. Accelerated by the COVID-19 pandemic in 2020, this transformation can be proven by the huge surge in the use of digital payments worldwide, particularly electronic payments. While this shift is considered to make the transaction better, it also has made cash transactions increasingly rare. According to PwC, these developments are central to the transformation of the financial sector, fostering inclusion and supporting the growth of digital economies (PwC, 2021).

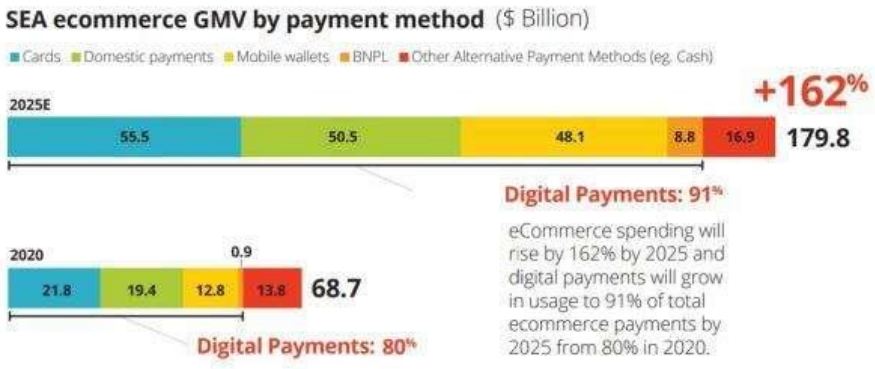

Figure 3 : Digital Payments To Lead 162% Growth In E-Commerce Spend Across Southeast Asia. Source Image By Idc Report,2021

In Southeast Asia, the digital evolution is especially pronounced, with e-commerce spending expected to rise by 162% to reach $179.8 billion by 2025. Digital payments are projected to account for 91% of these transactions, driven by changing consumer and retail trends, more inclusive payment options, and the rise of mobile wallets, domestic payments, and Buy Now Pay Later (BNPL) services (IDC, 2021).

Compounding this challenge is the rapid evolution of Indonesia's digital landscape. Forecasts indicate a significant increase in internet users, with an expected addition of 10.5 million users (+3.86 percent) between 2024 and 2028 (figure 4). This surge points to a broader acceptance of digital platforms and online transactions, suggesting a diminishing effectiveness of traditional sales methods. In this context, payment gateway

products and services must be strategically positioned to resonate with the digital-first approach increasingly preferred by businesses and consumers. In Indonesia, the payment gateway market is experiencing rapid growth and increasingly fierce competition. The emergence of a number of new players in this sector reflects the growing demand for diverse and reliable digital payment options.

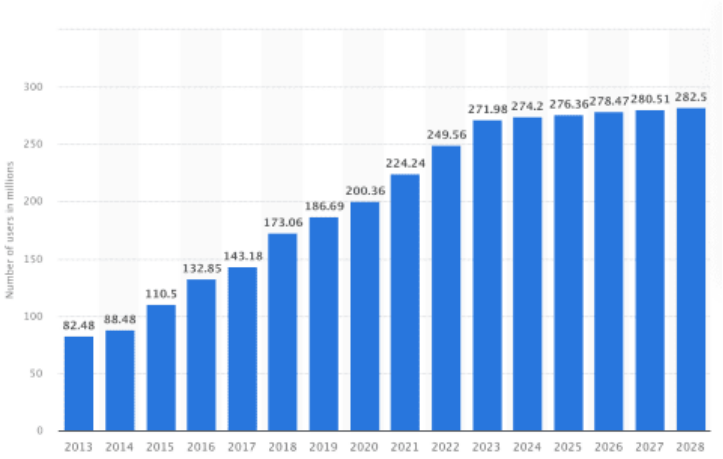

Figure 4 : Number Of Internet Users In Indonesia From 2013 To 2028. Source Image By Statista

According to the recent BCG report, the fintech sector in Indonesia is experiencing remarkable growth, due to various kind of factors such as high mobile usage, a burgeoning middle class, and supportive government policies. Consequently, this growth is fueling the expansion of digital financial services, including payment gateways, which have become crucial components of Indonesia's financial landscape. The BCG report emphasizes the rapid adoption of fintech solutions in Indonesia, pointing to substantial opportunities for further innovation and expansion (BCG, 2023)

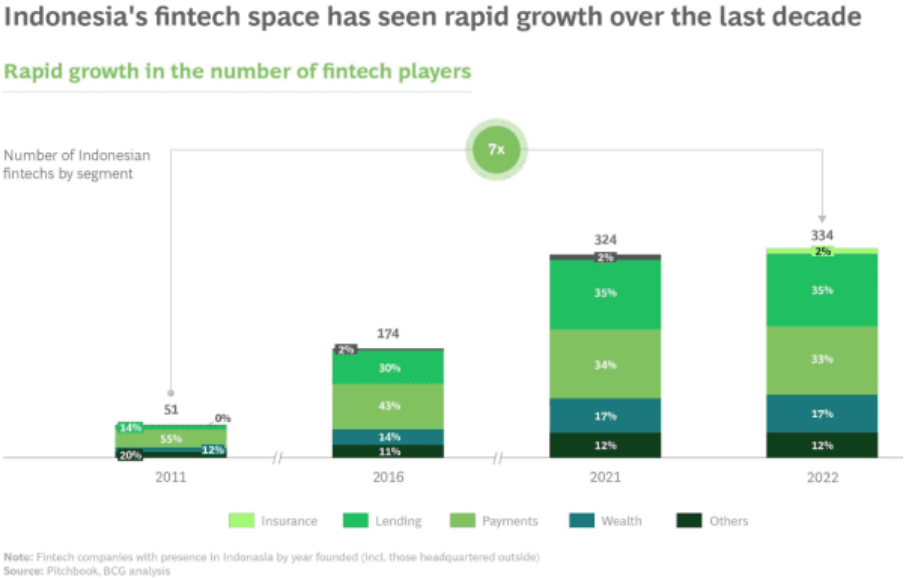

Figure 5 : Indonesia’s Fintech Growth Source Image By Pitchbook, Bcg Analysis

In this vibrant environment, the Indonesian payment gateway market is not only growing rapidly but also experiencing intense competition. The entry of several new players reflects the escalating demand for diverse and reliable digital payment methods.

Key players such as Duitku, Prismalink, Nicepay, Finpay, Midtrans, Xendit, Espay, Winpay, and Faspay are at the forefront of this movement. In such a competitive arena, merely offering payment solutions isn't sufficient; it's also crucial to ensure that transactions proceed smoothly, even during disruptions. Therefore, many companies and organizations are adopting multiple gateways, which helps them minimize the risks associated with depending solely on one provider.

DOKU's strategy for engaging merchants has seen success but now faces significant challenges in increasing activities. This situation reflects a broader industry trend, where digital or traditional engagement strategies must evolve to meet the sophisticated demands of today's market. A study by MIT Sloan highlights the importance of integrating data, analytics, and algorithms to better reach socially-linked modern consumers, emphasizing the role of social proof in marketing effectiveness (Stackpole, 2022).

The initial personal approach and digital follow-up, while effective in the past, no longer suffice. DOKU must advance its approach to ensure consistent merchant involvement, leveraging insights from the financial technology sector's shift towards data-driven engagement models. Google predicts shifts in the industry towards inclusive marketing campaigns, privacy-centric data strategies, and the importance of relevance and authentic purpose in branding (Karnowski, 2021).

The path to enhancing merchant engagement is fraught with obstacles. The full potential of DOKU's CRM system remains untapped, with missed opportunities to tailor experiences for merchants and predict their future needs. Many in the sector are struggling to fully integrate Big Data with CRM systems, limiting the ability to effectively analyze and act on customer data. Hootsuite's insights on digital trends emphasize the significance of a messaging-first strategy and integrating social CRM to build better digital campaigns (Hootsuite, 2022).

Table 1 : Doku Current Situation Vs Ideal Situation By Author

Aspect	Current Situation	Ideal Situation	Measurement Indicators
Merchant Activation & Engagement	A significant portion of onboarded merchants remains inactive, with less than 35% actively engaging in transactions.	Nearly all onboarded merchants are actively engaged, with regular transactions indicating successful integration into DOKU's ecosystem.	Percentage of active merchants post-onboarding, frequency of transactions per merchant, and growth in merchant transactions over time.
Data-Driven Merchant Management	Merchant management strategies are not fully leveraging data analytics, leading to generic engagement approaches.	Advanced data analytics drive merchant management strategies, enabling personalized engagement and tailored solutions for different merchant segments.	Increase in merchant segmentation accuracy, usage of personalized engagement strategies, and merchant satisfaction scores.
CRM Utilization	CRM systems are underutilized in	CRM systems are fully leveraged to	Number of personalized

	creating personalized merchant experiences and predictive analytics for future needs.	provide deep insights into merchant behavior, preferences, and potential churn risks, enhancing personalized experiences.	merchant interactions, churn rate reduction, and CRM system utilization rates.
Merchant Retention Strategies	Retention strategies lack a data-driven approach, resulting in missed opportunities for deepening merchant relationships.	Retention strategies are informed by detailed data analysis, focusing on high-value merchants and personalized retention programs.	Improvement in merchant lifetime value, retention rate increase, and loyalty program enrollment numbers.
Integration of Big Data & CRM	The integration between Big Data and CRM is nascent, limiting the potential for predictive analytics and segmentation.	A seamless integration of Big Data and CRM enables predictive analytics, efficient segmentation, and targeted marketing campaigns, driving higher merchant satisfaction and loyalty.	Degree of data integration achieved, number of data-driven campaigns executed, and increase in campaign conversion rates.

The gap analysis highlights the need for DOKU to evolve from its current state to a more ideal, data-driven approach in managing and engaging merchants. By leveraging advanced data analytics and fully utilizing CRM systems, DOKU can enhance merchant engagement to increase retention rate.

Why to Improve the Current System and the Importance of the Issue

DOKU's operating framework is being rapidly reshaped by the fast-evolving digital payment industry and the growing complexities of merchant needs. Shifting to a data-driven approach for managing merchant relationships is not just a minor change—it's essential for fully harnessing the power of digital innovation. Merging Customer Relationship Management (CRM) with Big Data analytics is key to this shift, offering unmatched opportunities for tailored interactions and forward-looking insights (Company., 2023).

The digital payment scene is constantly changing, with both merchants and consumers demanding more customized and agile services. Traditional B2B sales methods are struggling to keep up with these new requirements. For DOKU, adopting a digital-first strategy supported by advanced data analytics is vital to stay ahead of the competition and ensure ongoing growth (Morgan, 2023).

RESEARCH METHOD

This research outlines the research methodology, which links the theoretical concepts discussed earlier with the empirical evidence to be analyzed. It focuses on systematically collecting, analyzing, and interpreting data to evaluate the effectiveness of DOKU's Customer Relationship Management (CRM) strategies. The choice of research

design, data collection methods, and analytical techniques is crucial for gaining meaningful insights into merchant behavior and CRM efficacy within the digital payments domain.

The chosen methodology reflects the need to thoroughly address the research questions introduced earlier. It serves as the study's operational core, bridging the gap between theory and practice. This research is especially important due to the increasing complexity of data-driven CRM strategies, which requires a nuanced approach to understanding merchant retention.

This research establishes the methodological framework that guides all phases of data collection and analysis. It ensures the study meets rigorous academic standards while remaining grounded in practical applications. The insights gained from this methodology will contribute significantly to the field of digital payments and CRM, potentially influencing DOKU's strategy and broader industry practices.

This research continues by explaining the chosen research design and its rationale, including whether the approach is deductive or inductive. This approach must align with the study's objectives. The research's significance lies in its role as a transition from theoretical concepts to practical, data-driven conclusions.

RESULT AND DISCUSSION

Research Data Analysis and Findings

Building on the theoretical framework of Research 1 and the methodological approach of Research 3, Research 4 delves into empirical data analysis to reveal key patterns and insights that are important for merchant retention. Utilizing the RFM (Recency, Frequency, Monetary) model alongside comprehensive profiling, this research aims to segment the merchant base and assess their engagement levels. The findings will directly address the research questions posed in Research 1, providing empirical validation or refutation of the theoretical propositions. By investigating transactional data, distinct merchant segments and their behaviors will be identified, ultimately leading to the development of data-driven strategies that bolster merchant retention and engagement.

Data Overview

Data Set

The data set for this analysis came from the company CRM system, which is essential for various operations, awareness, transactional, acquisition, and retention efforts. While the CRM database contains a wealth of information, this analysis specially sharpened in on active merchant data, identified through active email engagement, as this data is most effectively managed within the CRM platform. This initial analysis of active email data served as the basis for a subsequent comprehensive data extraction from the broader database, facilitating a more in-depth analysis.

Data Attribute Refinement

The final dataset, a culmination of the initial strategic variables and the refined definitions outlined in the "Define Variables" section, provides a comprehensive and nuanced understanding of active merchant base. This meticulously curated dataset encompasses a wide range of attributes, including merchant identification, business characteristics, service utilization patterns, detailed transactional data, and the RFM metrics crucial for segmentation and targeted engagement strategies. This complete view of merchant activities, distilled from a variety of data points collected over time, becomes

the basis for subsequent in-depth analysis and the formulation of actionable insights for analysis.

Data Attribute	Description	
Number of Records	50,970 merchants	
Sampling of Analysis	6,000 merchants	
Time Period	1 year (January - December 2022)	
Early Identification Data	Email registered and active base on CRM database	
Data Source	Internal database	
Merchant Information	Merchant ID	Unique identifier assigned to each merchant.
	Joining date	Month and year
	Merchant Type	Classification of merchant size (Enterprise or SME).
	Merchant Base (Location)	Location of the merchant's business.
	LOB Merchants (Line of Business)	The industry or sector in which the merchant operates (Fashion, Mobility, Retail, F&B, Hospitality, OTA, Digital Business, Insurance, Marketplace, NGO, Government, Fintech).
Service Usage	Service	Payment Gateway
	Email Active Status	Indicates whether the merchant's email is active within the CRM database.
Transactional Data		
Number of Transactions	Success	Total successful transactions.
	Date of Transactions	The dates on which transactions occurred.
	Average Transaction Value (ATV)	The average amount spent per transaction.
	Payment Success Rate	Percentage of successful transactions.
	Refund Rate	Percentage of transactions resulting in refunds.
Payment Channels	Credit Cards	Transactions made using credit cards.
	Bank Transfer	Transactions made via bank transfers.
	Convenience Store	Transactions paid at convenience stores.
	QRIS	Transactions made using QRIS.
	E-Wallet	Transactions made through e-wallets.
	Direct Debit	Transactions paid through direct debit.
	Digital Banking	Transactions made via digital banking platforms.
	PayLater	Transactions using "buy now, pay later" services.
	Internet Banking	Transactions made through online banking.
RFM	Total Transaction Recency Dates (R)	Date of the merchant's most recent transaction.
	Total Frequency of Service Usage (F)	How often the merchant used the payment gateway.
	Total Transaction Value (Monetary Value) (M)	Total value of all successful transactions.

Figure 6 Data Attribute By Author

Data Cleaning and Profiling

The Data Cleaning and Profiling stage was a meticulous process designed to ensure the accuracy and reliability of the dataset. This involved refining the data by identifying and resolving errors, inconsistencies, or missing information that could potentially distort the analysis. In profiling, Merchant IDs were transformed into analysis codes that encapsulated key attributes such as industry, company size, and join date. This facilitated efficient organization and identification within the analytic system, with formulas established to easily filter and analyze data based on these codes.

Data cleaning was focused on retaining only the most relevant and critical information for the deep analysis process. This included key data points like merchant location, number of transactions (broken down by month and payment channel), total transaction value, average transaction value, and the recency of transactions. This streamlined dataset served as the foundation for subsequent in-depth analysis and insights.

No	Merchant ID	Joining Year	Customer Lifespan (CL)	Type of Industry	Locations	Size of Company	Number of Transactions	1	2	3	4	5	6	7	8	9	10	11	12	Total Transaction Value	Average Transaction Value	Transaction Recency Date
1	DKHWBP110420130710	2010	12	F&B	Surabaya	0-10	1418	128	57	71	354	156	85	71	85	99	71	99	142	129,432	91	12/25/2022
2	DKSU8K310620430817	2017	5	OTA	Jakarta	251-500	4493	674	180	225	898	180	449	449	180	225	180	449	404	2,292,760	510	12/3/2022
3	DKUSOYC10120330819	2019	3	Fashion	Jakarta	51-250	2546	102	153	127	637	76	178	102	127	76	178	255	535	1,230,579	483	12/29/2022
4	DK6ARX710820430218	2018	4	Insurance	Bandung	251-500	2388	191	167	215	215	191	167	239	167	191	215	191	239	1,154,909	484	12/27/2022
5	DK8UZRH110202330718	2018	4	NGO	Jogja	11-50	2155	151	172	194	194	216	194	151	172	151	172	194	194	120,644	56	12/17/2022
6	DKLE07H10320330219	2019	3	Retail	Semarang	51-250	200	6	8	26	72	8	12	8	6	8	8	38		62,168	311	11/29/2022
7	DKUXQFQ10620631213	2013	9	OTA	Surabaya	>1000	948	142	38	47	190	38	95	95	38	47	38	95	85	3,150,062	3,323	12/24/2022
8	DK4Q3Z111120630213	2013	9	Government	Jakarta	>1000	700	63	56	70	70	56	49	63	56	49	42	63	63	1,849,102	2,642	12/11/2022
9	DKYYZU810520230411	2011	11	Hospitality	Lombok	11-50	626	63	31	25	125	31	69	63	31	25	25	75	63	821,070	1,312	12/6/2022
10	DKZXO1C10620630518	2018	4	OTA	Bali	>1000	732	110	29	37	147	29	73	73	29	37	29	73	66	2,607,775	3,563	12/10/2022
..	DKQGZQN10420130910	2010	12	F&B	Jakarta	0-10	383	35	15	19	96	42	23	19	23	27	19	27	38	53,028	138	12/22/2022
..	DK2QO1X10320330313	2013	9	Retail	Jakarta	51-250	255	8	10	13	92	10	15	10	8	10	10	20	49	47,172	185	12/29/2022
1000	DKN1ZBA111120631221	2021	1	Government	Semarang	>1000	188	17	15	19	19	15	13	17	15	13	11	17	17	109,467	582	12/17/2022
..	DKEM5VT10420230617	2017	5	F&B	Bandung	11-50	1623	146	65	81	406	179	97	81	97	114	81	114	162	240,161	148	12/31/2022
..	DK9SO3X10320530419	2019	3	Retail	Semarang	501-1000	378	11	15	19	137	15	23	15	11	15	15	30	72	141,252	374	12/14/2022
2000	DKUOPSZ11020130518	2018	4	NGO	Jogja	0-10	3479	244	278	313	313	348	313	244	278	244	278	313	313	121,672	35	12/31/2022
..	DKP8J3P11120630315	2015	7	Government	Semarang	>1000	1059	95	85	106	106	85	74	95	85	74	64	95	95	996,785	941	12/25/2022
..	DK87LQN10520430117	2017	5	Hospitality	Semarang	251-500	3443	344	172	138	689	172	379	344	172	138	138	413	344	3,634,639	1,056	12/31/2022
3000	DKLPS8411020231016	2016	6	NGO	Surabaya	11-50	213	15	17	19	19	41	32	32	19	19				25,941	122	9/16/2022
..	DKZ5R1210620530222	2022	0	OTA	Bali	501-1000	374	56	15	19	75	15	37	37	15	19	15	37	34	1,039,079	2,778	12/14/2022
..	DKLOGG210220430818	2018	4	Mobility	Bandung	251-500	1615	242	48	65	323	81	129	145	113	97	65	145	162	3,809,254	2,359	12/30/2022
4000	DKB63BZ10820430214	2014	8	Insurance	Bandung	251-500	121	10	8	11	11	10	8	12	8	10	11	10	12	38,181	316	12/31/2022
...	DK4AVB810420130122	2022	0	F&B	Jogja	0-10	2846	256	114	142	712	313	171	142	171	199	142	199	285	172,472	61	12/31/2022
...	DKVJAVD11020130119	2019	3	NGO	Surabaya	0-10	1367	96	109	123	123	137	123	96	109	96	109	123	123	89,824	66	12/29/2022
5000	DKRDGOB10220630422	2022	0	Mobility	Medan	>1000	1399	210	42	56	279	70	112	126	98	84	56	126	140	1,328,264	949	12/4/2022
...	DK0O5NF10820530222	2022	0	Insurance	Bandung	501-1000	1467	117	103	132	132	117	103	147	103	117	132	117	147	2,153,123	1,468	12/31/2022
...	DKERA3610320330617	2017	5	Retail	Medan	51-250	368	11	15	18	132	15	22	15	11	15	15	29	70	153,606	417	12/31/2022
...	DKVWNVW10620230311	2011	11	Hospitality	Jogja	11-50	346	35	17	14	69	17	38	35	17	14	14	41	35	558,953	1,615	12/30/2022
...	DKOU2IH10920530918	2018	4	Marketplace	Semarang	501-1000	888	27	36	53	133	62	44	36	44	36	44	169	204	717,035	807	12/8/2022
5997	DKDRU2H10120230816	2016	6	Fashion	Medan	11-50	468	19	28	70	117	14	33	19	23	14	33	98		204,279	436	11/30/2022
5998	DKEPP9Z10720230720	2020	2	Digital Business	Jakarta	11-50	2588	233	181	155	337	233	181	285	155	129	207	259	233	370,014	143	12/31/2022
5999	DKPOHWR10520230319	2019	3	Hospitality	Surabaya	11-50	220	22	11	9	44	11	24	22	11	9	9	26	22	379,060	1,723	12/20/2022
6000	DKYL93K10920530213	2013	9	Marketplace	Bandung	501-1000	1143	34	46	69	171	80	57	46	57	46	57	217	263	984,516	861	12/31/2022

No	CC	Transaction Fee CC	Bank Transfer	Transaction Fee BT	Convenience Store	Transaction Fee CS	QRIS	Transaction Fee QRIS	e-wallet	Transaction Fee wallet	Direct Debit	Transaction Fee DD	Digital Banking	Transaction Fee DB	Paylater	Transaction Fee Paylater	Internet Banking	Transaction Fee IB
1							1,417	Rp 639										
2	339	Rp 16,288	3,065	Rp 4,000					881	Rp 20,412							206	Rp 5,000
3	57	Rp 15,533			313	Rp 5,000			1,383	Rp 19,334					795	Rp 11,117		
4	138	Rp 15,542	817	Rp 4,000							691	Rp 11,673	744	Rp 11,673				
5			1,762	Rp 4,000					292	Rp 2,239	102	Rp 3,120						
6	44	Rp 10,704	79	Rp 4,000					77	Rp 12,434								
7	250	Rp 95,040	111	Rp 4,000					431	Rp 132,914							157	Rp 5,000
8			184	Rp 4,000							325	Rp 54,832	195	Rp 54,832				
9	504	Rp 38,725					89	Rp 9,181	30	Rp 52,465								
10	13	Rp 101,751	319	Rp 4,000					245	Rp 142,501							197	Rp 5,000
..							384	Rp 969										
..	201	Rp 7,180	20	Rp 4,000					35	Rp 7,400								
1000	50	Rp 18,304									93	Rp 13,645	48	Rp 13,645				
..																	1,623	Rp 5,000
..					40	Rp 5,000	124	Rp 2,616	216	Rp 14,947								
2000			653	Rp 4,000					2,826	Rp 1,399								
..	199	Rp 28,355	527	Rp 4,000									333	Rp 20,825				
..	618	Rp 31,558	555	Rp 4,000	82	Rp 5,000	594	Rp 7,390			150	Rp 23,113	389	Rp 23,113	325	Rp 24,280	731	Rp 5,000
3000			106	Rp 4,000					110	Rp 4,872								
..	78	Rp 79,792	110	Rp 4,000					150	Rp 111,131							35	Rp 5,000
..			895	Rp 4,000			452	Rp 16,511			268	Rp 49,173						
4000	105	Rp 10,835			12	Rp 5,000											4	Rp 5,000
...			318	Rp 4,000			1,763	Rp 424	766	Rp 2,424								
...									779	Rp 2,628	146	Rp 3,314	442	Rp 3,314				
5000	305	Rp 28,584	447	Rp 4,000					645	Rp 37,978								
...	652	Rp 43,096			632	Rp 5,000											183	Rp 5,000
...									368	Rp 16,696								
...	89	Rp 47,233	15	Rp 4,000													241	Rp 5,000
...									757	Rp 32,299					132	Rp 18,572		
5997							52	Rp 3,055	415	Rp 17,460								
5998	2,091	Rp 6,003							493	Rp 5,719			5	Rp 4,859				
5999			218	Rp 4,000														
6000	5	Rp 26,118	911	Rp 4,000	6	Rp 5,000									216	Rp 19,811	5	Rp 5,000

RFM Analysis

RFM Results Analysis

The RFM analysis, calculated using a specialized analytical system and following the scoring guidelines detailed in Research 3, was applied to a meticulously chosen sample of 6,000 merchants. This sample, constituting 10% of the active merchant population within the original database of 50.970 merchants, was strategically selected using a stratified random sampling methodology. This approach ensured the sample mirrored the diverse attributes of the entire merchant base, encompassing factors like size, industry type, and transaction volume. The resulting segmentation was derived by plotting the sum of Frequency and Monetary scores divided by two on the Y-axis, intersected with the Recency score on the X-axis.

No	Merchant ID	Type of Industry	Recency Score	Frecuency Score	Monetary Score	FM Score	Segmentation
1	DK00LIA11020130122	NGO	1	1	1	1	Hibernating
2	DK00TUV10720431021	Digital Business	5	1	1	1	New Customers
3	DK013RT11220430721	Fintech	5	5	2	3.5	Potential Loyalist
4	DK01DAJ10220330516	Mobility	5	1	1	1	New Customers
5	DK01DK111220230511	Fintech	4	5	3	4	Loyal Customer
6	DK02B6D10120330619	Fashion	2	3	3	3	At Risk
7	DK02HU611220330714	Fintech	5	1	1	1	New Customers
8	DK02V3J10420330807	F&B	5	3	3	3	Potential Loyalist
9	DK02XTQ10620530122	OTA	4	3	5	4	Loyal Customer
10	DK02YRS10420330818	F&B	2	1	1	1	Hibernating
11	DK0312R10620530113	OTA	4	5	5	5	Loyal Customer
12	DK036DN10620530310	OTA	5	5	5	5	Champions
13	DK03E6211120430814	Government	2	4	2	3	At Risk
14	DK03MAD11020131015	NGO	3	2	1	1.5	Needs Attention
15	DK03OW110320331117	Retail	5	4	3	3.5	Potential Loyalist
16	DK03Q4B11020230413	NGO	1	1	1	1	Hibernating
17	DK048SQ10420230520	F&B	5	3	1	2	Potential Loyalist
18	DK04F1P10620430619	OTA	1	5	5	5	Can't Lose Them
19	DK04LPJ10220330210	Mobility	5	1	2	1.5	Promising
20	DK04VSG10220131119	Mobility	1	1	1	1	Hibernating
..	DK054U710720430619	Digital Business	4	4	5	4.5	Loyal Customer
..	DK058J310720530320	Digital Business	2	3	4	3.5	At Risk
1000	DK05S1O11020330615	NGO	4	3	1	2	Potential Loyalist
..	DK05SLX10620330811	OTA	3	3	5	4	Loyal Customer
..	DK060EC10520330507	Hospitality	4	3	5	4	Loyal Customer
2000	DK06FK310820430421	Insurance	5	4	4	4	Potential Loyalist
..	DK06HQ610320130118	Retail	1	3	2	2.5	At Risk
..	DK06L5R10720530113	Digital Business	3	1	2	1.5	Needs Attention
3000	DK06MZH10920630408	Marketplace	4	4	3	3.5	Potential Loyalist
..	DK06UVV10720531109	Digital Business	5	4	3	3.5	Potential Loyalist
..	DK06VZL11020230607	NGO	5	3	1	2	Potential Loyalist
4000	DK07OCR10120431019	Fashion	4	5	5	5	Loyal Customer
...	DK07OQV10720430918	Digital Business	1	2	2	2	At Risk
...	DK07VZP10320431208	Retail	4	4	2	3	Potential Loyalist
5000	DK080W710420230221	F&B	1	1	1	1	Hibernating
...	DK087UG10920330718	Marketplace	5	1	2	1.5	Promising
...	DK08AI211020330918	NGO	5	4	1	2.5	Potential Loyalist
...	DK0FQHR10420431107	F&B	1	2	3	2.5	At Risk
...	DK0G0F110820330909	Insurance	2	3	4	3.5	At Risk
5997	DK0G1YQ10820430921	Insurance	2	5	5	5	Can't Lose Them
5998	DK0G9YI10720630415	Digital Business	1	4	4	4	At Risk
5999	DK0GNZH10920331216	Marketplace	4	1	2	1.5	Promising
6000	DK0H2UR11020331110	NGO	4	2	1	1.5	Promising

Figure 7 RFM Analysis Result By Author

Figure 8 Segmentation Result By Author

Segmentation Result Analysis

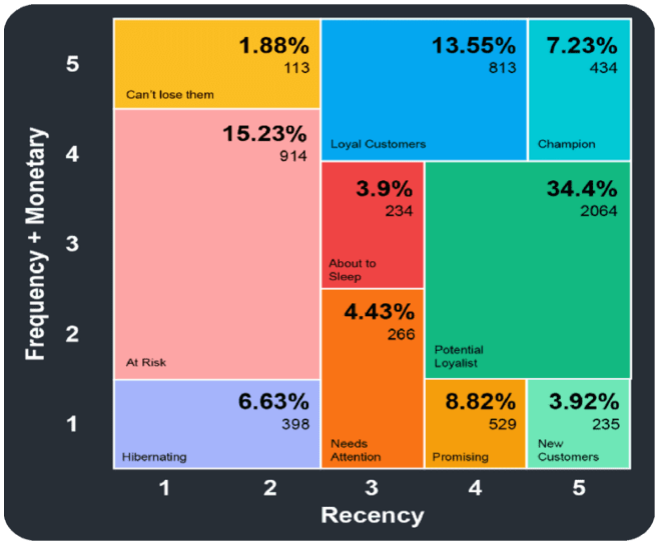

Figure 9 RFM Chart

	[Avg] Score	[Avg] Value	[Total] Value	Count
Recency	3.63	61.57	369,436.00	
Frequency	3	1,411.34	8,468,023.00	
Monetary	3	Rp 775,695,391.14	Rp 4,654,172,346,868.00	
Merchant				6000

Figure 10 : Total Average RFM Score By Author

The RFM analysis of the 6,000 merchant sample, representative of the company's active customer base, reveals a diverse range of engagement and spending behaviors. On average, merchants transact every 61 days (Recency), complete 1,411 transactions (Frequency), and spend Rp 775,695,391 per transaction (Monetary). Total transaction value for the analyzed merchants reached an impressive Rp 4.65 trillion.

While the presence of Potential Loyalists (34.4%) signifies a substantial opportunity for growth, the considerable proportion of At Risk (15.23%) and Hibernating (6.63%) merchants indicates a pressing need to address churn. Conversely, Loyal Customers and Champions, making up approximately 21% of the sample, underscore the importance of maintaining strong relationships with high-value segments. This analysis underscores the need for a multi-pronged approach that balances growth strategies with retention efforts, catering to the distinct needs of each segment to maximize customer lifetime value and overall revenue.

Merchant Segmentation Scatter Plots by Industry

This section examines the correlation between different RFM (Recency, Frequency, Monetary) dimensions to understand the engagement and value of merchants across

various industries. By analyzing these relationships, patterns and insights critical for developing targeted CRM strategies can be identified.

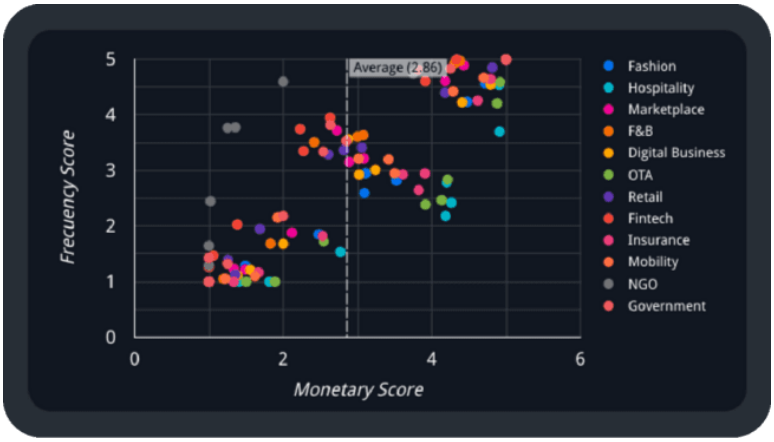

Figure 11 Frequency vs Monetary Scatter Chart By Author

Scatter Chart 1 : Frequency Score (Y-axis) vs. Monetary Score (X-axis)

This scatter plot illustrates the distribution of merchants based on their transaction frequency and monetary value, providing insights into their engagement levels and spending patterns.

- **High Frequency, High Monetary**
  Populated by the "Champions" segment (7.23%, 434 merchants), primarily from industries like Fashion, Hospitality, and Fintech. These merchants exhibit both high frequency and high monetary scores (average scores of 4.71 and 4.70 respectively), signifying consistent engagement and substantial transaction values. This segment contributes significantly to overall revenue and demonstrates strong loyalty.
- **High Frequency, Low Monetary**
  Merchants with frequent transactions but lower individual transaction values. The "Promising" segment (8.82%, 529 merchants), primarily from Marketplace and F&B industries, falls into this category. Their average frequency score (1.35) indicates consistent engagement, but their lower monetary score (1.32) suggests potential for growth by increasing transaction values.
- **Low Frequency, High Monetary**
  Merchants with high-value transactions but low frequency. This includes the "Can't Lose Them" segment (1.88%, 113 merchants), with sectors like Government and NGO, suggesting occasional high-value engagements. Their average monetary score of 5.00 underscores their importance despite their lower frequency (1.61).
- **Low Frequency, Low Monetary**
  Merchants with low engagement and transaction values. The "Hibernating" segment (6.63%, 398 merchants), primarily from industries like F&B and NGO, falls into this category. Their low average frequency (1.14) and monetary (1.23) scores indicate a need for targeted re-engagement strategies to increase their activity and value.

Scatter Chart 2: Recency Score (Y-axis) vs. Monetary Score (X-axis)

This scatter plot examines the relationship between a merchant's recency (how recently they transacted) and their monetary value, revealing insights into recent spending patterns and their correlation with overall transaction value.

Figure 12 Recency vs Monetary Scatter Chart By Author

- **High Recency, High Monetary**
  Dominated by high-value, recently active merchants primarily from industries like Fashion, Hospitality, and OTA. The "Champions" segment (7.23%, 434 merchants), with an average recency score of 5.00 and average monetary score of 4.70, exemplifies this group. This quadrant also includes a significant portion of "Loyal Customers" (13.55%, 813 merchants), indicating sustained engagement and spending.
- **High Recency, Low Monetary**
  Merchants who have transacted recently but with lower transaction values, particularly those from the Retail and Digital Business sectors. The "New Customers" segment (3.92%, 235 merchants) is prominent here, with an average recency score of 5.00 and a low average monetary score of 1.00. This suggests the potential to increase transaction value through targeted promotions and incentives.
- **Low Recency, High Monetary**
  Merchants who have not transacted recently, indicating a risk of churn. This quadrant is populated by merchants from industries like NGO and Government, including the "Can't Lose Them" segment (1.88%, 113 merchants), with an average monetary score of 5.00 but a low recency score of 1.61. Proactive re-engagement efforts are crucial to retain these valuable customers.
- **Low Recency, Low Monetary**
  Merchants with both low recency and low monetary scores, primarily from the F&B and NGO sectors. The "Hibernating" segment (6.63%, 398 merchants), with average scores of 1.25 for recency and 1.23 for monetary, is the primary occupant of this quadrant. This segment requires substantial reactivation efforts to re-engage them with the platform.

Scatter Chart 3: Recency Score (Y-axis) vs. Frequency Score (X-axis)

This scatter plot visualizes the relationship between recency and frequency, providing insights into the overall engagement level of merchants across different industries.

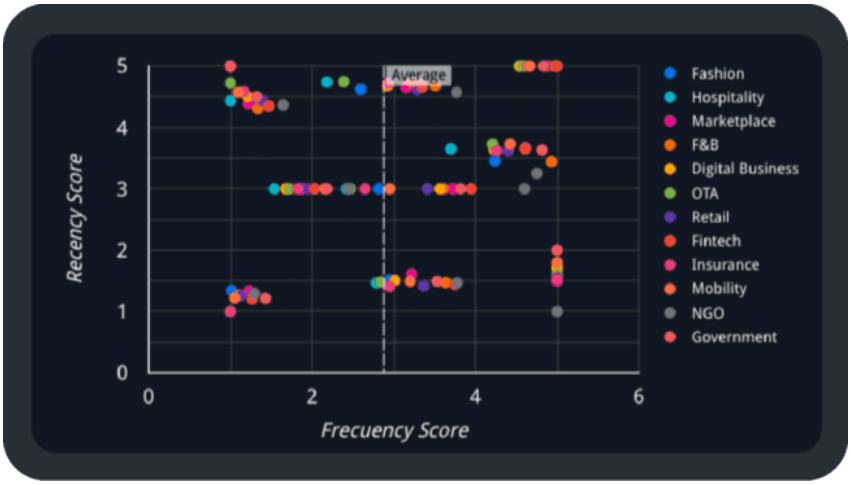

Figure 13 Recency vs Frequency Scatter Chart By Author

- **High Recency, High Frequency**
  Characterized by frequent and recent transactions. The "Champions" segment, with average scores of 5.00 for both recency and frequency, dominates this quadrant, with significant representation from industries like Fashion and Fintech.
- **High Recency, Low Frequency**
  Merchants who have engaged recently but infrequently. This includes the "New Customers" segment (average scores of 5.00 for recency and 1.00 for frequency), which features merchants from various sectors, particularly NGO and F&B. Strategies to increase their transaction frequency are recommended.
- **Low Recency, High Frequency**
  Merchants with high transaction frequency but less recent activity, indicating potential decline in engagement. The "Can't Lose Them" segment (average scores of 1.61 for recency and 5.00 for frequency) falls into this category, with a notable presence from industries like OTA and Insurance. These merchants require attention to prevent further disengagement.
- **Low Recency, Low Frequency**
  Merchants, with both low recency and low frequency. The "Hibernating" segment (average scores of 1.25 for recency and 1.14 for frequency) is the primary occupant, with representation from various sectors, emphasizing the need for significant re-engagement efforts across industries.

Merchant Profiling, Characteristic Patterns and Behavior

This subresearch focuses on the engagement patterns observed across different merchant segments. By analyzing these patterns to understand the behavioral tendencies of various segments, providing insights into how to tailor CRM strategies effectively.

Transactional Insights by Type of Industry: Unveiling Payment Preferences, Opportunities, and Customer Lifetime Value

The analysis of transactional data from a sample of 6,000 merchants reveals a diverse landscape of payment channel preferences across industries, highlighting opportunities for targeted marketing and engagement strategies. Furthermore, examining the relationship between payment channels and Customer Lifetime Value (CLV) provides insights into how payment preferences impact long-term customer value.

RFM Segmentation and Payment Channel Preferences: Uncovering Targeted Opportunities for Engagement and Growth

Delving deeper into the RFM segmentation reveals distinct payment channel preferences across customer segments, offering valuable insights for tailoring engagement strategies and optimizing customer lifetime value (CLV). By understanding the unique behaviors and preferences of each segment.

Monthly Transaction Trends: A Deep Dive into Seasonality Segments and Type of Industry

Type of Industry	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
F&B	219,737	180,449	271,360	595,464	304,644	174,908	156,395	176,390	154,072	178,563	182,511	171,636
OTA	110,007	34,832	57,772	145,813	51,232	72,158	65,739	38,754	39,509	26,060	47,088	29,301
Hospitality	51,683	28,297	37,513	104,793	43,057	56,252	45,398	34,715	24,789	18,602	37,386	23,770
Fashion	29,214	48,393	51,791	162,100	42,067	48,099	34,889	50,185	36,583	45,724	53,531	52,772
Insurance	46,738	41,627	61,507	59,950	55,914	49,004	59,641	43,965	39,942	39,224	29,868	23,836
Marketplace	19,869	28,585	72,353	100,730	50,156	37,350	31,448	49,788	46,967	38,077	86,366	55,270
Digital Business	44,523	38,328	43,601	71,639	52,006	43,585	49,531	35,843	27,050	29,039	30,268	19,264
Retail	16,651	29,047	37,302	176,212	28,472	30,260	23,422	26,522	26,173	23,724	41,386	38,786
Mobility	67,203	17,753	29,999	90,786	33,464	39,644	36,829	33,399	27,520	17,766	28,564	19,748
Fintech	34,870	32,056	45,624	68,727	44,560	49,357	40,400	47,181	33,839	27,484	29,270	18,738
Government	34,122	31,172	43,912	40,063	35,710	31,134	31,771	28,124	23,803	19,391	20,334	13,640
NGO	33,085	35,416	48,341	45,848	48,045	38,750	33,404	33,809	26,871	25,426	21,026	13,239
Total	***707,702***	***545,955***	***801,075***	***1,662,125***	***789,327***	***670,501***	***608,867***	***598,675***	***507,118***	***489,080***	***607,598***	***480,000***

Segmentation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Potential Loyalist	191,175	131,592	209,341	473,911	170,886	181,402	172,209	153,238	136,114	157,191	275,871	258,403
Loyal Customer	178,942	102,697	279,780	469,704	263,163	148,480	137,244	129,843	132,339	174,954	214,431	0
At Risk	123,710	149,488	122,790	225,732	129,040	148,405	124,885	146,976	83,289	2,398	0	0
Champions	103,280	55,391	65,457	246,661	79,821	87,562	83,114	67,693	62,170	78,597	84,180	197,880
About to Sleep	23,454	16,712	32,346	72,254	49,043	20,283	17,980	18,843	26,307	34,980	0	0
Promising	17,624	13,844	27,064	42,429	18,739	17,283	15,756	15,771	14,259	15,102	26,111	14,589
Can't Lose Them	35,301	43,121	30,838	56,468	33,031	36,406	32,213	40,214	26,199	770	0	0
Needs Attention	13,658	10,695	15,489	42,125	27,069	12,597	11,342	11,517	16,189	20,196	0	0
Hibernating	15,321	18,139	13,112	19,894	12,593	12,831	9,408	9,664	5,830	249	0	0
New Customers	5,237	4,276	4,858	12,947	5,942	5,252	4,716	4,916	4,422	4,643	7,005	9,128
Total	***707,702***	***545,955***	***801,075***	***1,662,125***	***789,327***	***670,501***	***608,867***	***598,675***	***507,118***	***489,080***	***607,598***	***480,000***

Figure 14 Monthly Transaction Trend By Author

Analysis of monthly transaction data reveals a nuanced interplay of seasonal fluctuations and segment-specific behaviors within the merchant ecosystem. While April emerges as a peak month for transaction volume across numerous sectors, including F&B, OTA, Hospitality, Fashion, Digital Business, Retail, Mobility, Fintech, and Marketplace, with bank transfers and credit cards dominating as preferred payment methods. This widespread trend suggests a collective surge in consumer spending and engagement during this period, potentially driven by seasonal factors or promotional events. Conversely, October and December consistently demonstrate lower transaction volumes across multiple industries, particularly for transactions made through bank transfers and credit cards, indicating potential off-peak periods.

High-value segments like Champions demonstrate consistent engagement throughout the year, predominantly relying on bank transfers and credit cards, while also showing a high adoption of QRIS. However, the Potential Loyalist segment, the largest by merchant count, experiences significant fluctuations, indicating a need for targeted interventions during off-peak months. The alarming decline in transactions among the At Risk segment underscores the urgency of proactive retention strategies.

Furthermore, industry-specific trends highlight diverse seasonal patterns. The Insurance, Government, and NGO sectors, with a preference for bank transfers and credit cards, experience consistent peaks in both March and April. This suggests a sustained period of increased activity in the first half of the year, potentially influenced by specific industry-related events or cycles.

- **Industry Trends: A Tale of Peaks and Valleys**
  - **Peak Season**
    April emerges as a peak month across numerous sectors, including F&B (595,464 transactions), OTA (145,813 transactions), Hospitality (104,793 transactions), Fashion (162,100 transactions), Digital Business (71,639 transactions), Retail (176,212 transactions), Mobility (90,786 transactions), Fintech (68,727 transactions), and Marketplace (100,730 transactions). This widespread trend suggests a collective surge in consumer spending and engagement during this period, potentially driven by seasonal factors or promotional events.
  - **Consistent Peaks**
    The Insurance, Government, and NGO sectors deviate from this pattern, exhibiting consistent peaks in both March and April. This indicates a sustained period of increased activity in the first half of the year, possibly influenced by specific industry-related events or cycles.
  - **Low Season**
    October and December consistently demonstrate lower transaction volumes across multiple industries, including F&B (154,072 transactions in September), OTA (26,060 transactions in October), and Retail (23,724 transactions in October). This suggests a natural decline in consumer activity during these months, potentially requiring targeted marketing efforts to stimulate engagement.
- **Segment-Specific Trends: A Deeper Look at Customer Behavior**
  - **Champions**
    This high-value segment maintains consistent transaction volumes throughout the year, with a slight dip in February (55,391 transactions) and October (78,597 transactions). This indicates strong loyalty and a consistent need for DOKU's services.
  - **Potential Loyalists**
    This largest segment shows greater fluctuations, peaking in April (473,911 transactions) and experiencing a significant decline in September (136,114 transactions). This suggests a need for targeted engagement strategies to maintain their interest during off-peak months.
  - **At Risk**
    A worrying downward trend is observed, with the lowest point in November (2,398 transactions). This highlights the urgency of proactive retention strategies to prevent churn.
  - **Other Segments**
    The remaining segments also exhibit unique monthly patterns, with "About to Sleep" showing a decline in recent months and "New Customers" steadily increasing their transactions.

Merchant Base by Location

Locations	*Number of Transactions*	*Monetary*
Yogyakarta	202,519	Rp 78,095,891,600
Surabaya	1,732,221	Rp 947,634,882,432
Semarang	509,104	Rp 283,692,645,664
Medan	463,721	Rp 310,612,687,294
Manado	55,367	Rp 99,598,141,842
Makassar	99,884	Rp 59,516,542,770
Lombok	46,582	Rp 84,438,065,566
Jogja	761,567	Rp 225,048,827,926
Jakarta	1,667,855	Rp 858,663,693,751
Bogor	70,267	Rp 101,752,165,348
Bandung	1,896,264	Rp 997,156,128,246
Bali	962,672	Rp 607,962,674,429
Total	***8,468,023***	***Rp 4,654,172,346,868***

Figure 15 : Locations Monetary By Author

The analysis of transaction data by location reveals a concentrated yet diverse merchant base, with significant opportunities for expansion and growth in untapped regions.

- Dominant base
  - **Surabaya**
    This bustling city stands out as the dominant, accounting for 1,732,221 transactions and a substantial Rp 947,634,882,432 in monetary value. This signifies a thriving merchant ecosystem with a strong demand for digital payment services.
  - **Bandung**
    Following closely behind is Bandung, with 1,896,264 transactions and Rp 997,156,128,246 in monetary value, indicating a similarly robust market with high potential for further growth.
  - **Jakarta**
    The capital city, Jakarta, also plays a significant role, contributing 1,667,855 transactions and Rp 858,663,693,751 in monetary value. This reflects a mature market with established merchant networks, but also potential for deeper penetration and increased engagement.
- **Emerging Markets and Untapped Potential**
  - **Yogyakarta, Semarang, Medan, Jogja**
    These cities, with transaction volumes ranging from 202,519 to 761,567, represent emerging markets with significant untapped potential. Their considerable monetary value suggests a presence of both SME and enterprise merchants engaging in online/digital business activities. Targeted marketing and localized strategies could further drive growth and adoption in these regions.
  - **Bali**
    With 962,672 transactions and a monetary value of Rp 607,962,674,429, Bali presents a unique opportunity for enhancement. As a major tourist destination

with a thriving e-commerce scene, this region could benefit from tailored payment solutions and marketing campaigns that cater to the specific needs of both local and international merchants.

- **Other Regions**
  Smaller cities like Manado, Makassar, Lombok, and Bogor, despite lower transaction volumes, still hold considerable monetary value, suggesting a presence of high-value merchants and potential for expansion. Investing in infrastructure and localized marketing efforts in these areas could unlock untapped revenue streams.

Business Solution : A Data-Driven Framework for Merchant Retention

Result diverse merchant base, spanning enterprises and SMEs across a wide range of industries, presents a unique set of challenges for retention. With over 50,000 merchants active and a complex landscape of transaction patterns and payment preferences, a one-size-fits-all approach is insufficient. A robust, adaptive, and data-driven framework is essential to effectively address these challenges and drive long-term merchant loyalty.

A refined RFM analysis, enriched with merchant profiling and additional relevant variables, provides the foundation for this solution. By incorporating factors such as industry type (e.g., F&B, OTA, Retail), company size (Enterprise vs. SME), and geographic location (Surabaya, Jakarta, Bandung, etc.), Company can move beyond basic segmentation to create a more nuanced understanding of its merchant base. This granular view enables the identification of distinct clusters of merchants with unique behaviors and preferences.

Integrating this enriched analysis into the company's system empowers actionable insights. For instance, the analysis of 6,000 active merchants revealed significant variations in CLV (Customer Lifetime Value), ranging from Rp 10.5 million (New Customers) to Rp 265.7 million (Can't Lose Them). This knowledge allows DOKU to prioritize high-value segments, such as the Champions (7.23%) and Loyal Customers (13.55%), who contribute significantly to revenue. Additionally, it highlights the need for targeted engagement strategies for lower-CLV segments like the Promising (8.82%) and Needs Attention (4.43%) groups, focusing on increasing transaction frequency and value.

The Customer Segmentation Dashboard (CSD), a dynamic and interactive visualization tool integrated within the database analytic, further enhances this data-driven approach. By providing real-time insights into merchant behavior, trends, and the impact of ongoing strategies, the CSD empowers marketing, PR, brand sales, and product teams to make informed decisions, particularly marketing. Its flexibility to adjust variables based on evolving business goals and target segments ensures the solution remains relevant and adaptable to changing market dynamics and from the result the company can be more sharpened into taking action either from personal approach, digital approach with giving rich insight to customer relationship management with tools or not.

For example, if the company launches a new payment method, the CSD can quickly assess its adoption rate across different segments and industries, allowing for swift adjustments to marketing strategies to maximize uptake. Similarly, the CSD can track the impact of promotional campaigns on specific segments, helping to identify successful tactics and areas for improvement.

CONCLUSION

This comprehensive analysis of the merchant base through the lens of enriched RFM segmentation, transactional trends, payment preferences, and CLV reveals a dynamic and nuanced landscape. The findings underscore the importance of adopting a data-driven approach to customer engagement and retention. By understanding the distinct behaviors, needs, and preferences of various merchant segments can tailor its marketing, product development, and support strategies to maximize customer lifetime value and drive sustainable growth. The Customer Segmentation Dashboard emerges as a powerful tool for translating these insights into actionable initiatives, enabling DOKU to navigate the evolving digital payment landscape with agility and precision.

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