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Segmentation of business saving customer to improve average balance based on structural equation modeling (SEM) and recency, frequency, monetary (RFM): Case study Bank XYZ in Indonesia

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Abstract- As business players, entrepreneurs certainly need bank products and supports that provide fast and easy services with wide-spread network in Indonesia. RFM is a segmentation method based on past data and create an index on a client where the high loyalty and assume the behaviour of customers in the index will be the same in the future. Certainly, customers with high RFM score were customers who become the target of the Bank because these customers have high loyalty and valuable for the Bank. In this study, segmentation performed based on transactions which affect the increase in average balance using Structural Equation Model (SEM). The objects of RFM segmentation is to identify the customer in order to build a marketing strategy for each segment with different levels of loyalty. As the segmentation results we found three driver categories, High Recency, Middle Recency and Low Recency customer category. High Recency is considered Active customer where campaign category can be cross/up-selling and promotional accordingly with their Frequency and Monetary. Middle Recency category is considered Risky customer where campaign category can be retention program accordingly with their Frequency and Monetary. Last, Low Recency is considered Churn customer where campaign category is reactivation

Keywords- *Bank, Structural Equation Modeling, Recency Frequency & Monetary, Saving Product*

1. INTRODUCTION

The marketing development of banking products is becoming highly competitive and important. The growth of the banking industry has also changed from offering their products and services into marketing relationships which focus on the customer to increase their loyalty.

The increase of customer loyalty is highly expected to increase customer average balance, specifically in this research towards the business savings product of Bank XYZ and increase the effectiveness of campaign strategy conducted.

According to Anderson, Kerr [1], based on objective of customer loyalty, the company's financial growths evidently occur through the increasing of loyal customers. According to Goldstein, Sheldon [2] customer satisfaction is a feeling, but customer loyalty is behavior. Therefore, an appropriate methodology is needed to enable the company to identify their customers based on their loyalty level to continue with the campaign execution.

2. THEORETICAL REVIEW

2.1 Recency, Frequency and Monetary

RFM technique is based on three customer attributes encompassed of are Recency of Purchase, Frequency of Purchase, and Monetary Value of Purchase. The purpose of RFM Score is to predict customer behavior in the future. Therefore banks need to translate customer behavior into numeric status for it can be used for measurement.

According to Kumar and Reinartz [3] the RFM methodology is based on recency, frequency and monetary value. This technique uses 3 metrics to evaluate customer behavior and customer value.

Recency is a measure of how long the last transaction occurred within the customer. Frequency is a measure of how often the customer conduct specific transaction in the Bank for a certain period. Monetary value is a measure of how much the volume of customer transactions within a certain period. The general idea of RFM is to classify customers based on their RFM group which is generated from their transaction behavior.

The initial customers grouping generate 27 groups which is divided base on their RFM score. Each customer is coded accordingly. Each customer has their value of R, F, and M that may be higher or lower than the average value of R, F, and M for all clients. The customer is coded 3 (for High), 2 (for medium) and 1 (for low) for their RFM, and so for all customers. Furthermore, from the discriminant analysis we obtained that the group resulted can be used to differentiate the customer.

RFM techniques help organizations significantly, not only in identifying and targeting valuable customers which have a very high chance for the transactions, but also campaign effectiveness for customers who have lower chance for transaction. The limitation of RFM is that RFM techniques can be applied only to customer with available historical data and not to prospects data.

2.2 Structural Equation Modeling

Confirmatory Factor Analysis on SEM is used to confirm the most dominant factors in one group of variables. Regression Weight on the SEM used to determine how much the relationship between variables.

Structural Equation Modeling (SEM) tests the sequence of interdependence relationships between variables simultaneously. This technique is specifically useful to identify the relationship between dependent variable towards independent variable in more complex situation.

The reason we used Structural Equation Modeling (SEM) in this research is to identify the most influential transactions in the banks which increase the average balance of business savings[4]. Confirmatory Factor Analysis on SEM is used to confirm the most dominant factors in one group of variables. Regression Weight on SEM is used to examine how big the relationship between variables.

3. RESEARCH METHOD

The research was conducted in 4 (four) months from April 2016 until July 2016. The data source used is the transaction data of customers of Business Savings in Bank XYZ encompassed of Customer profile data and transaction type data which is obtained from transaction data of business saving customer of Bank XYZ.

3.1 Most Influential Transaction Variables

The highest influential transaction determination is conducted using Confirmatory Factor Analysis method, where Regression Weight is used to determine the transaction to be used in RFM segmentation.

3.2 Customer Loyalty Variables

Customer segmentation is developed using RFM method. The variables in the RFM method encompassed of recency, frequency, monetary. For the Recency, the variable to be measured is the time of last transaction per customer in 2016. For the Frequency, the variable to be measured is the number of Transaction per customer (frequency) during the period 2016, and for the Monetary, variable measured is the amount of transaction volume of each customer in a period of 4 months in 2016.

3.3 RFM Analysis

RFM analysis is used to segment the customers. The RFM analysis conducted in this study used the Principal Component Analysis (PCA) method to calculate the relative weighting of the R, F and M. metrics. The relative weights are used to calculate the cumulative points for each customer [3].

To do customer segmentation based on RFM required five steps[5]. First sorting the customer based on transactions determined by SEM results encompassing of recency; frequency; and monetary. For recency, the customer database is sorted from the most recent transactions to the longest transaction. For frequency is sorted from the highest frequency of transactions to the lowest frequency of transactions. For monetary value obtained from the total volume of customer transactions for 4 months.

Second, determine the binning score for each RFM group. Scores are given based on matrices R, F and M.

Third, determine the order of matrices of R3, R2, R1, F3, F2, F1 and M3, M2, M1. The scores obtained for each of the R, F and M of the PCA results are used to combine and generate the weighted RFM points (333 to 111)

Fourth, calculate the combination of points for each customer and divide them into 9 group of segmentation, starting from the customer with the highest percent RFM cumulative point (333) to the customer with the lowest RFM cumulative point (111) (see table 4.2). The higher the cumulative points obtained from a customer, the more profitable the customer will be in the future.

Fifth, conduct the do campaign based on customer RFM category.

4. RESULT

From the results of Confirmatory Factor Analysis and Regression Weight on SEM used to examine how much relationship between variables transactions obtained encompassed of Cash Deposit, Online Transfer-in, Clearing-in, Overbooking-in, we analyze the transactions that have the most influence to the increase of average balance, then the result is “clearing-in” transaction for the most influential transaction variable. The clearing-in transaction definition is a transfer transaction coming from another Bank coming into Bank XYZ.

Identification of influential transactions.

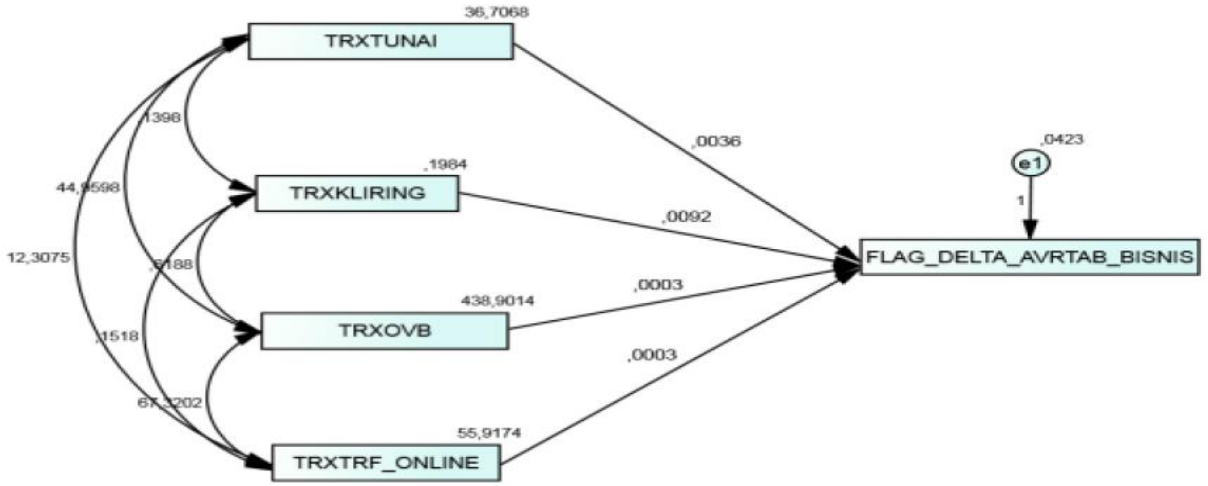

Figure1. Path Diagram

Table 1. Regression Weight (Group number 1-Default Model)

	Estimate	S.E.	C.R.	P	Label
FLAG_DELTA_AVRTAB_BISNIS <--- TRXTUNAI	,004	,000	16,593	***	
FLAG_DELTA_AVRTAB_BISNIS <--- TRXTRF_ONLINE	,000	,000	1,902	.057	
FLAG_DELTA_AVRTAB_BISNIS <--- TRXKLIRING	,009	,003	3.387	***	
FLAG_DELTA_AVRTAB_BISNIS <--- TRXOVB	,000	,000	4.050	***	

4.1 Segmentatio of RFM

RFM segmentation is done by binning process against Recency, Frequency and Monetary.

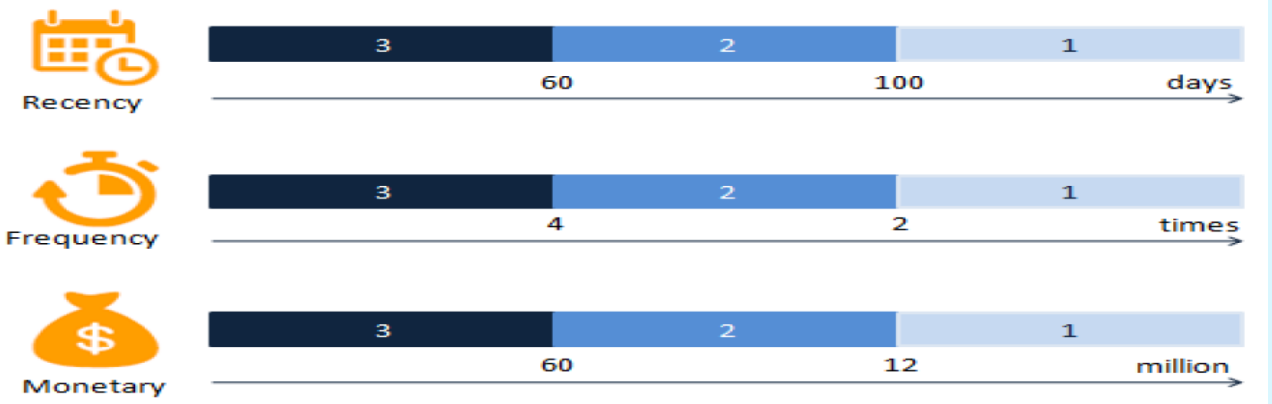

Figure 2. Binning of RFM

Table II. Segmentation of RFM

	Recency	Frequency	Monetary 1	Monetary 2	Monetary 3
X/Up-Sell, Promotional	3 (Active)	3			Engaged
		2		Loyal	
		1	New Customer		
Retention Program	2 (Risk)	3			New Affair
		2		Enjoy Affair	
		1	Time to Broke Up		
Reactivation Campaign	1 (Churn)	3			Broken Heart
		2		Agony	
		1	No Hurt Feeling		

Table III. Segmentasi Result of RFM

Recency	Frequency	Monetary 1	Monetary 2	Monetary 3		
3 (Active)	3	271	1,794	5,620	8375	Engaged
	2	760	1,411	961	2322	Loyal
	1	1,788	1,151	640	3699	New Cus
2 (Risk)	3	211	1,028	1,720	4060	New Affair
	2	1,173	2,072	1,312	3664	Enjoy Affair
	1	3,963	2,465	1,381	7602	Time to Broke Up
1 (Churn)	3	63	245	449	1660	Broken Heart
	2	877	1,455	966	3477	Agony
	1	5,912	3,378	1,959	10167	No Hurt Feeling

RFM segmentation divides customer segmentation based on the highest RFM weight (333) to the lowest (111) divided into 9 segment categories: Engage, Loyal, New Customer, New Affair, Enjoy Affair, Time to Break-up, Broken Heart, Agony and No Hurt Feeling.

Naming segments can be customized by product. The higher the cumulative score of RFM, the higher the loyalty of the customer.

Hence customer segmentation is based on RFM score.

The results of RFM segmentation of Bank XYZ customers shows the customer population in accordance with its RFM score from highest to lowest score. (See table III).

4.2 Campaign Strategy

The result of this RFM score then becomes reference for Bank XYZ strategy to conduct campaign activity to increase the average balance of Business Savings.

Customers with RFM of 1, 2, 3 segment can be offered with Cross Selling campaign, Up Selling and promotion. Segment 4, 5, 6 can be offered with retention program. While segment 7, 8, 9 can be offered with reactivation program (see Table III).

5. CONCLUSION & SUGGESTIONS

In setting a campaign strategy to increase the average balance of business savings products, bank can used RFM segmentation based on the most influential transactions that increase the average balance. By using the transaction that influence the most and conduct segmentation profiles of Bank XYZ customer in the RFM matrix, the Bank will obtain target customer based on its loyalty level and therefore Bank can allocate their budget more effectively. The Campaign Strategy for each RFM segment can be based on customer loyalty level encompassed of Engage, Loyal, etc (see Table III) which based on RFM cumulative Score (333-111) accordingly with the budget, time and potential RFM market segmentation.

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