



RFM vs. Loyalty Builders' Modeling

Comparing our technology to a typical RFM analysis

HOW RFM WORKS

Traditional database marketing is usually based on a methodology called RFM — short for Recency, Frequency and Monetary value. Recency is the length of time since a customer's last purchase; Frequency measures the number of times a customer has made purchases; and Monetary value is the dollar amount of those purchases. Database marketers use various combinations of these three numbers to score a customer.

A weakness of the RFM approach is apparent in Table 1, which describes the purchasing histories of two customers. Both customers have identical R, F and M scores, and yet the interpretation of those values suggests very different futures for the two. Other problems with the RFM approach appear when they are combined to form a single score.

For example, a recent publication described how an RFM score was calculated for customers making transactions in the past half-year. If their last purchase was in the first quarter of that half-year, R was assigned the value 1; if in the second quarter, R is set to 2. Frequency was set to the number of purchases in that half-year. M is the total revenue from that customer in the half-year

period. The three numbers (R, F and M) were multiplied together to get the RFM score. Customers were then compared on the basis of their computed scores.

Clearly, this scheme has the desirable property that if two customers have any two of the three measures

equal, then the one rating higher on the third measure will have the higher RFM score. However, when customers differ on more than one of these measures and trade-offs must be made between the R, F and M values, some very difficult-to-justify scores appear, as shown in Table 2 below.

Table 1
A Purchase History Comparison by RFM

Customer	Jan.	July	Sept.	Dec.	Jan.
Customer X	\$1,500	\$1,000	\$500	\$200	\$100
Customer Y	\$100	\$200	\$500	\$1,000	\$1,500

Table 2
Comparing Customer Measures

Cstmr.	Qtr. 1	Qtr. 2	R	F	M	RFM
A	\$375	--	1	1	\$375	375
B	\$240, \$5	--	1	2	\$245	490
C	\$220, \$5, \$5	--	1	3	\$230	690
D	\$100, \$20	\$5	2	3	\$125	750
E	\$5, \$20	\$100	2	3	\$125	750
F	--	\$375	2	1	\$375	750
G	\$350, \$25	--	1	2	\$375	750
H	\$750	--	1	1	\$750	750
I	--	\$750	2	1	\$750	1,500
J	--	\$370, \$5	2	2	\$375	1,500
K	\$370	\$5	2	2	\$375	1,500
L	\$5	\$370	2	2	\$375	1,500

There are many questionable comparisons contained in Table 2. We note that between customers B and C, the “tradeoff” between M (\$15 more by B) and F (one more purchase by C) favors C by 200 RFM points, whereas the three purchases by C for \$230 rate 315 points above the single purchase of \$375 by A. Also, between customers H and J, if H made the purchase on the last day of Quarter 1 and J made the purchase on the first day of Quarter 2, the difference in one day’s activity doubles the score for J.

This formulation of RFM-scoring is atypical in that its multiplicative formulation puts such importance on recency and frequency. The more common approach involves some form of weighted sum of the three measures. The difficulty in this instance is two-fold. First, how are the weights to be determined? And, second, no matter how they are determined, they introduce a constant trade-off between the measures. These trade-offs imply, for example, that \$1 of M is worth so many days of recency (R) and so many purchases (F), regardless of the particular customer’s values.

HOW THE LOYALTY BUILDERS MODEL WORKS

Loyalty Builders collects four numbers from each transaction — “who” (customer ID); “when” (transaction date); “what” (product identifier or SKU) and “how much” (amount of

Loyalty Builders collects four numbers from each transaction — “who” (customer ID); “when” (transaction date); “what” (product identifier or SKU) and “how much” (amount of transaction). Any linear analysis of those numbers, including multivariate regression, principle components, cluster analysis and RFM, would not be an accurate predictor of behavior for the overwhelming mass of customers who were not in the very best or very worst groups.

transaction). All of the usual measures of customer loyalty, including Recency, Frequency, Monetary Value and Retention (how long that person has been a customer) can be calculated from this data, and Loyalty Builders reports these numbers as one part of a loyalty analysis.

However, Loyalty Builders realized early on that any linear analysis of these numbers, including multivariate regression, principle components, cluster analysis and RFM, would not be an accurate predictor of behavior for the overwhelming mass of customers who were not in the very best or very worst groups (see our white paper, “*The Mathematics of Customer Loyalty*,” for a detailed discussion of why this is so).

As a result, Loyalty Builders developed a proprietary, non-linear model of customer loyalty to score customers. Our model compares every transaction with the entire set of transactions, rather than just considering the transactions of an individual customer in calculating that customer’s score.

Also in this model, Retention and Recency are blended together with a newly developed algorithm that correctly accounts for such factors as frequent purchases by a new customer or a lack of purchases by a long time customer. We have also found that the range of products purchased has a significant effect, and that too is included. The resulting model is strikingly predictive, far more so than simple RFM.

Consequently, Loyalty Builders can tell its clients which customers are most likely to purchase next, what they are most likely to buy, when they’ll likely do it and even which customers are potential defectors.

COMPARISON WITH RFM

The Loyalty Builders model is based on proprietary mathematical techniques that we have developed and validated; they offer significant improvements over an RFM approach. Key differences between RFM and Loyalty Builders are outlined below, followed by a set of questions to help you decide whether a particular type of analysis is appropriate for your business.

1. The Loyalty Builders model is non-linear, while most RFM implementations are linear. Any linear method involves a constant “trade-off” between variables. Linear models have poor scores discrimination for the large majority of customers because of these tradeoffs.

2. The Loyalty Builders model is much more granular than RFM. Its calculations are based on the exact date of a transaction, rather than using just a bucket for a particular calendar period. There could be a big difference in the implications of a purchase on the first day of a quarter as opposed to the last day of the quarter. Loyalty Builders' exact-date methodology leads to a much more accurate analysis and avoids such inconsistencies as occurs between customers H and I of Table 2.
3. The Loyalty Builders model includes data about the variety of products that are purchased, and yields important information about which products will be purchased next, and which products drive the purchase of others. RFM does not differentiate between the types of products purchased.
4. The Loyalty Builders model compares individual purchase patterns to the purchases of the entire population of customers. This approach yields a more holistic view of the customer, and leads to a segmentation that is much more sensitive to differences in the transaction record. For example, the two customers of Table 1 will be ranked differently by the Loyalty Builders model. While Loyalty Builders measures loyalty relative to the population as a whole, RFM only considers a customer's own purchases in determining a score for that customer.
5. The Loyalty Builders model has parameters that can be "tuned" (customized) to reflect the type of business analyzed. The RFM approach is standard for all companies.
6. The Loyalty Builders model produces several other useful indices of customer performance in addition to score, including Purchase Delays and Amount Score (see the Loyalty Builders white paper, *"How To Use A Loyalty Analysis In Your Company,"* for a discussion of these indices). These indices can be used to create an early-warning system to spot potential customer defections. RFM only has a score.
7. The Loyalty Builders model generates measures of dealer performance and summary measures for product lines or divisions of the company itself. RFM only generates customer scores.
8. The Loyalty Builders model produces verifiable revenue projections for the customer base, including revenue from new accounts. RFM only generates customer scores. While RFM

Questions To Ask When Choosing A Methodology

The lack of product information in an RFM scoring scheme leads to some questions that any company considering RFM should ask itself.

- Q1** Is the total dollar amount of a purchase all that counts, or does the variety of different products purchased influence the value of a customer to the company?
- Q2** Is the value of a particular product well described by its price? Some products are loss leaders. Some products are initial purchases that lead to a family of follow-ons. Some products are more profitable than others. Blurring these differences leads to inaccurate predictions.
- Q3** Are there natural interpurchase times for continuing customers? For example, if some products need to be renewed or maintained on a yearly basis, that product cycle can disrupt a quarterly or bi-annual RFM analysis.
- Q4** Are there patterns to customer purchases? For example, do first purchases or certain other reoccurring/periodic purchases differ greatly in dollar amount from others? What does the magnitude of particular purchases imply? A customer spending above or below average amounts on such purchases may have an above or below average long-term value to the company. This behavior should be recognized in a loyalty analysis.

The Loyalty Builders model accommodates all these situations, and RFM typically does not.

gives an overview of past performance, any attempt to use such an analysis to plan for the future leads to straight-line projection with all its pitfalls (see *Revenue Projections* in the *Reports* tab of the online demo.)

9. The Loyalty Builders model reveals patterns about products — which products drive purchases of other products. RFM typically ignores product data, and has no way to examine purchase patterns (see the Appendix to the white paper, “*How To Use a Loyalty Analysis In Your Company*”).

SUMMARY

Both RFM and the Loyalty Builders model use transaction data as the basis for segmenting and scoring customers. However, Loyalty Builders uses more data, takes a more holistic approach, is more granular and employs a mathematically more sophisticated non-linear model without the constant trade-offs inherent in a linear model such as RFM. Consequently, Loyalty Builders is able to model customer behavior in a way that provides more information about and insight into the company’s business, and the results are more accurate and more predictive. Finally,

Loyalty Builders is able to produce other useful indices of customer and company performance beyond the basic customer scoring. ■

To find out more about what Loyalty Builders LLC can do for your business, go to loyaltybuilders.com, or e-mail:

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