Improving Performance with Out of Stock Analysis

A Step-by-Step Guide to Creating an Out of Stock Analysis

Accelerated Analytics®
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Improving Performance with Out of Stock Analysis

Introduction

Most vendors have in stock rates in the 98%+ range or you will find yourself on the short list to be replaced. As a result, many vendors don't see the need or benefit of working on improving the last 2%. However, there are several things to realize:

1. A 98% in stock rate is an average. In all likelihood, if a detailed store/SKU level analysis is conducted, some stores are much lower. Identifying and correcting those stores will yield an immediate increase in sales.

2. Promotions increase the likelihood of out of stocks and are often not accounted for in the calculated replenishment model retailers use to forecast demand and set inventory replenishment rates.

3. A 2% out of stock rate can mean hundreds of thousands of dollars in lost sales over the course of a year that can be easily avoided with the right analysis.

Key Considerations

It is important to understand that an out of stock analysis is a rear view diagnostic. In other words, when the out of stock is detected, lost sales have mostly likely already occurred. An out of stock analysis is different than a SKU forecast which is presented in another article in this series. The SKU forecast uses a historical rate of sale to predict a future rate of sale and recommends an inventory on hand to meet future demand. While the purpose of the two analyses is different, both are useful.

The out of stock analysis identifies stores where problems are occurring right now so you can take corrective action and code those stores for easy reference in the future. We also find some buyers are reluctant to act on a forecast presented by a vendor, but they are likely to take action to correct a list of stores with no inventory. Over time, the out of stock analysis can be used as an effective tool to build credibility with the buyer on data analysis competency and slowly move them to the more proactive forecasting approach.

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Step-By-Step Construction

1. Set-up Out of Stock Report

To set-up for the out of stock report, you need a store/SKU level On Hand (OH) history by week for the past 52 weeks, a sum of total dollars sold for the 52-week period, and a sum of total units sold for the 52-week period. The data table example in Figure 1 has been shortened to show only 7 weeks of on hand, however your table will include 52 weeks of OH. The sample data table is for one SKU. In the SKU Analysis and Store Analysis articles in this series, you have created a list of A and B stores and SKU's which should be used in the out of stock analysis to limit the amount of data to be analyzed. Depending on the number of A and B SKU's/stores you are analyzing, you may be able to have one table with SKU in the first column and store in the next column, or you may need to conduct the analysis for one SKU at a time. *See Figure 1.*

FIGURE 1

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD
151	53	0	28	26	0	77	70	$2,168.44	136
6315	74	63	46	68	59	88	83	$3,678.73	250
6320	28	102	96	83	76	71	65	$2,877.00	195
6367	97	90	87	84	74	63	58	$2,576.22	175
6346	33	67	57	44	74	63	96	$3,074.18	209
734	26	23	20	18	16	11	9	$1,115.52	73

A null OH is sometimes reported by a retailer when the last OH was zero and there has been no change. So you might see data where the OH was zero and then one or more null weeks where the OH was not reported. This is a method used by retailers to reduce the size of data files. Although less common, you may also see instances where the OH was greater than 1, then a null week, and then an OH greater than 1. This may be a store/SKU with no sales activity for the null week, so no OH was reported to reduce the file size. Or, it could be an out of stock occurred, but an order was received the next week.

2. Count the Out of Stock Weeks

The first task is to count the out of stock weeks in the 52 weeks of on hand data. To do this, you will use the Excel count function. Most data sets will contain two types of out of stock: a null OH week and a zero OH week. Most retailers will report some null OH's . Since it cannot be determined from the data if those are zeros or a store that did not report, count these as out of stock. Create two columns. Use the Excel count function to sum the blank cells by entering COUNTBLANK(RANGE). Next fill the second column using the Excel count function by entering COUNTIF(range, "<1"). By creating two columns, you will be able to break apart your analysis to only include zeros should you determine the nulls in your data are not actually out of stocks. *See Figure 2*

FIGURE 2

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF	
151	53	0	28	26	0	77	70	$2,168.44	136	0	2
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0
734	26	23	20	18	16	11	9	$1,115.52	73	0	3

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3. Total Out of Stock Weeks

Next create a column for total out of stock weeks by summing the two count columns together. This is the total number of weeks out of 52 that the SKU/store was out of stock. *See Figure 3.*

FIGURE 3

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3

4. Determine Average SKU Level Item Selling Price

The next column to be created is the average SKU level item selling price over the range of the data. This can be calculated by dividing the total dollar sales by the total units sold. Some retailers include dollars sold in their data and some do not. It is preferable to have your retailer provide dollars because it will include any promotional pricing or discounting. However, if your retailer does not provide this data, you can use the SKU MSRP in this column instead of the calculated selling price. *See Figure 4.*

FIGURE 4

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS	DLRS/UNIT
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2	$15.94
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1	$14.71
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2	$14.75
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0	$14.72
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2	$14.71
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3	$15.28

5. Calculate Average Weekly Selling Velocity

To calculate the lost dollars due to stock outs, you will need to calculate the average weekly selling velocity of the SKU/store. Create an average weekly units sold column and divide total units sold by 52. *See Figure 5.*

FIGURE 5

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS	DLRS/UNIT	AVG WKLY UNITS
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2	$15.94	6.48
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1	$14.71	11.90
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2	$14.75	9.29
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0	$14.72	8.33
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2	$14.71	9.95
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3	$15.28	3.48

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6. Calculate Lost Dollars Due to Stock Outs

Now you are ready to calculate the lost dollars due to stock outs by creating a new column. Calculate the lost dollars by multiplying the average weekly units sold times the average unit selling price times the total number of out of stock weeks. This figure is an estimate of what would have sold if the SKU had not been out of stock. *See Figure 6.*

FIGURE 6

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS	DLRS/UNIT	AVG WKLY UNITS	LOST DLRS
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2	$15.94	6.48	$206.58
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1	$14.71	11.90	$175.04
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2	$14.75	9.29	$274.05
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0	$14.72	8.33	$0.00
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2	$14.71	9.95	$292.72
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3	$15.28	3.48	$159.52

7. Calculate Cumulative Lost Dollars

To make the data table easier to scan and analyze, add a column for cumulative lost dollars. This column is helpful in scanning down to determine where important thresholds like 80% of sales are reached. *See Figure 7.*

FIGURE 7

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS	DLRS/UNIT	AVG WKLY UNITS	LOST DLRS	CUM LOST DLRS
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2	$15.94	6.48	$206.58	$206.52
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1	$14.71	11.90	$175.04	$381.56
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2	$14.75	9.29	$274.05	$655.61
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0	$14.72	8.33	$0.00	$655.61
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2	$14.71	9.95	$292.72	$948.33
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3	$15.28	3.48	$159.52	$1107.85

8. Calculate In Stock Percentage

The final column to be added is a calculated in stock percentage. To do this, use the formula:

1-Total out of stock weeks/52

This is a very useful metric because it can be compared to the in stock percentage as provided by the retailer on the vendor performance scorecard. It is also helpful for demonstrating to management and retail replenishment managers that even when there is a high in stock percentage, lost sales are occurring. *See Figure 8.*

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FIGURE 8

STORE	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	SALES	UNITS SOLD	COUNT IF		TTL OOS WKS	DLRS/UNIT	AVG WKLY UNITS	LOST DLRS	CUM LOST DLRS	IN STOCK %
151	53	0	28	26	0	77	70	$2,168.44	136	0	2	2	$15.94	6.48	$206.58	$206.52	96%
6315	74	63	46	68	59	88	83	$3,678.73	250	1	0	1	$14.71	11.90	$175.04	$381.56	98%
6320	28	102	96	83	76	71	65	$2,877.00	195	1	1	2	$14.75	9.29	$274.05	$655.61	96%
6367	97	90	87	84	74	63	58	$2,576.22	175	0	0	0	$14.72	8.33	$0.00	$655.61	100%
6346	33	67	57	44	74	63	96	$3,074.18	209	2	0	2	$14.71	9.95	$292.72	$948.33	96%
734	26	23	20	18	16	11	9	$1,115.52	73	0	3	3	$15.28	3.48	$159.52	$1107.85	94%

9. Create Executive Summary

We recommend you summarize the results of the out of stock analysis to internal management and the retail replenishment manager in terms of lost dollars sold. This is the metric that will cause people to take action. The two tables seen in Figure 9 are very effective at presenting the magnitude of the problem. Choose the SKU with the highest amount of lost dollars sold and format two summary tables to show the amount of money lost due to out of stock stores and the most chronically out of stock stores for that SKU. This can be used as an example to gain agreement with the replenishment manager to identify the causes and actions needed to correct the problem. *See Figure 9.*

FIGURE 9

EXECUTIVE SUMMARY

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SKU 789461 – Out of Stock Analysis (52 weeks ending 8/29/09)	
Total lost units sold	8,166
Total lost dollars sold	$69,411.48
In-Stock %	98.5%

Store	Lost Units Sold	Lost Dollars Sold
6711	366	$3,111.00
4848	312	$2,652.00
1973	201	$1,705.5
6424	189	$1,606.5
2548	174	$1,479.00
7454	167	$1,419.50
5214	142	$1,207.00
3188	127	$1,079.50
3874	98	$833.00
4156	84	$714.00

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Additional Considerations

After completing your analysis of A and B stores, we recommend you compare the average out of stock rate for the stores to the in stock rate provided by your retailer to see how closely they compare. For example, if the out of stock rate at A and B stores is 1%, then those stores are 99% in stock. If your scorecard in stock rate is more than 1% different, you should consider also conducting the out of stock analysis for your C and D stores and SKU's to identify any problems.

Low fill rates will cause out of stocks. Therefore, check to ensure your file rates are at or above the target level on your vendor scorecard before presenting the results to your retail buyer. If your fill rates are below target, you have several options:

- Work on improving the fill rate and conduct the analysis again after several months of sales history is available

- Identify the periods when fill rates were below target and subtract them from the total out of stock stores

If you select this approach, make sure you note this very clearly on your data table and your presentation so the credibility of your analysis is not questioned. If your fill rate has been at or above target during most of the 52-week analysis period, you can probably take the second approach. If your fill rate has been below target for a majority of the period, you should probably address fill rate issues first and then conduct the analysis at a later date.

Next Steps

This analysis is one in a series of articles that provides step-by-step guidelines to creating reports and analyses that can help you better understand and improve SKU and store performance. The series includes the following articles:

- Store Analysis
- SKU Analysis
- Out of Stock Analysis
- SKU Forecast

To purchase and download additional articles in this series, visit www.acceleratedanalytics.com.

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About The Rainmaker Group

The Rainmaker Group is a data warehouse and software engineering firm that created the Accelerated Analytics® service to provide POS information services to vendors and retailers. The Accelerated Analytics® service improves sales and supply chain visibility by providing an easy solution for sharing and analyzing sales and inventory data without any of the technical headaches.

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