

## HARVESTING THE MARKET BASKET



**ARE YOU ABLE TO MINE THE TREASURE TROVE OF INTELLIGENCE ABOUT  
CONSUMER PREFERENCES AND BUYING DECISIONS BURIED IN THE SHOPPING CART?**

# Harvesting the Market Basket

## “God is in the details”

Ludwig Mies van der Rohe, German born American architect, 1886-1969

One of the well known and frequently quoted adages in the American lexicon these days reminds us, “(t)he devil is in the details”. Generally attributed to the 19th century French novelist Gustave Flaubert, this expression suggests that even the grandest project depends on the success of the smallest components. The more positive version, above, from van der Rohe holds that success comes to those who can parlay the details into a grand design. Either way you look at it, competitive advantage is in the details. For retailing that means understanding everything possible about the sales transaction; such things as: *What time of day did the customer shop? How long did it take to check out? Was their loyalty card used? Who was the cashier? How long did it take to tend? How many items--by type--were in the basket? What was the relationship among the purchased items? How do other baskets compare?* The massive universe of available consumer data can be gold for merchandisers, if they are able to perform analyses quickly, easily, and inexpensively. And that is what **1010data** has developed - a powerful yet straightforward way to conduct powerful Market Basket Analysis. Let us explain . . .

### Market Basket Analysis: A Definition

The introduction of the barcode scanner ushered in an era of metrics-based decision making for retailers. It was the first data analysis revolution in retail – providing a complete and reliable source of objective sales data. Since then, the POS T-log (transaction log) has been heralded as a “goldmine” of information, but in truth, it’s not been systematically tapped into.

Traditional approaches to data warehousing and business intelligence have generally been adequately successful in meeting the needs of SKU-by-store level analysis for most retailers. Data collected from POS systems today is usually summarized and then loaded into a data warehouse. Most of us are familiar with the software and hardware technologies that have been used over the years to produce dashboards and reports to facilitate decision making using this level of data. It has been a relatively good thing, although expensive and cumbersome for most retailers. The challenge now is that the solution has not gone far enough nor fast enough for the ever data-hungry user.

Let’s define Market Basket Analysis. Simply, it is a process to understand,

- What items are being purchased by customers in their individual baskets, and over time across trips?
- What are all the metrics associated with the basket? (i.e. sales, margin, time, etc)
- What are the relationships of the items in the sale? (i.e. likely to be purchased together, or affinity)

However, Market Basket Analysis is often interpreted more broadly to refer to the analysis of detailed “transactional” data, or data at the “atomic” level. Such datasets would include the most granular level of data – the “line item detail” – the contents of every basket. Hence the term “Market Basket” data since the presence of such data is what most visibly sets this kind of system apart. But according to this definition, the focus is not only on the interactions of items within the basket. Rather, it is the effort to understand all of the characteristics of a retailer’s operation that are impossible to be gleaned from summarized data, or is not commonly found in systems that store just summarized data.

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At a minimum, a Market Basket Analysis system will store the following data values for each transaction:

- Store
- Date
- Loyalty Card (if appropriate)
- Individual UPCs/SKUs along with their quantities and prices

The next most desirable attribute is typically some measure of profit for each UPC/SKU in the basket. But this only scratches the surface of analytical possibilities given the wealth of data typically collected at the POS. Every attribute of each transaction can be loaded into the data warehouse - including, but not limited to:

- Exact time of transaction
- Terminal/Lane
- Cashier
- Duration of transaction
- Time spent on individual actions in transaction
- Net-price at item level, accounting for coupons
- Item Weight
- Returns
- Tender details (cash, credit, debit, food stamps, etc)
- Reward points - awards and redemptions
- Was UPC manually entered?
- Was weight manually entered, or from scale?

This information concerning the basket can then be supplemented with additional sources of data such as:

- Demographic characteristics of individual consumer
- Geo-demographics surrounding stores
- Inventory data
- Promotional details
- Coupon billing (vendor, department, or corporate funding, etc.)
- Historical weather observations

These datasets represent a vast amount of data when viewed at the transactional level. Those retailers that are able to harness its power to make more informed decisions will be successful.

## **Why you need it...**

Now more than ever, successful retailing requires a comprehensive understanding of the consumer. Today's customer has changed and will continue to change. The changing economy, the continual onslaught of new technology, the war on terrorism and the green movement have all contributed to changing the way customers shop. Consumers are smarter, more nimble, more selective and less loyal than ever before. Accordingly, a retailer's repository of data must switch gears from simply reporting what sold, to provide insight into who bought, when and for what reason.

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Retailing today also requires extremely efficient execution. Store operations, merchandising, marketing and advertising must all perform consistently with little room for error. Due to continually increasing pressure on margins in many segments of the retail industry, only the best are surviving. This all requires that retailers develop a firm understanding of their operations and maintain the ability to delve into the operational data to ask any question.

Traditional data warehousing systems were designed to handle large amounts of summarized information to address a predefined set of questions. In order to be nimble and adaptable, retailers need the ability to continually measure and probe at all aspects of their business with new questions.

## What you can do with it...

Following are a sampling of real-world scenarios that demonstrate the power of market basket analysis.

### More Effective Pricing and Promotion

#### *Example 1 – Product Profitability*

A retailer sells laundry detergent at an aggressive every-day low price. Historically, they've been happy with the results. Sell-through is high and sales look good. They're confident that the sacrificed margin is justified as it must be driving traffic to the stores and generating incremental sales of other items. However, upon looking more closely at the baskets that contain the laundry detergent, they begin to realize that those baskets tend to be single-SKU, or otherwise small baskets. In reality, the pricing strategy was not at all efficient, but this would have been impossible to determine without gaining visibility into the market basket. Using this insight, the retailer decided to raise the every-day price. They expect sales of laundry detergent to drop, and they may even lose some customers. But those customers were not profitable in any case, and the improved margin on the future detergent sales will result in profits being net-positive.

#### *Example 2 – Promotional effectiveness*

A mass merchandising retailer is looking to increase sales in a particular product category (A) they view as strategic. Their first approach was to engage with the principal supplier of product in this category to jointly fund a promotional program. Unfortunately, the supplier was not willing to participate. They then looked at a product affinity analysis, which shows the other categories, brands, or items most tightly associated with this category. They discover that Category B has a strong relationship with it. Buyers of Category B products tend to also buy items from Category A, more-so than the general population, and it so happens that they have a great relationship with the suppliers of Category B products! They were able to secure promotional funding from this supplier, and the "tag-along" effect generated a lift in sales in Category A as predicted.

#### *Example 3 – Promotion expense control on key items*

Grocery retailers regularly fund promotions of key items to generate predictable traffic for the store. One such retailer is struggling with the burden of funding their Premium Orange Juice promotion, where they've traditionally offered a \$2 price point, a savings of \$1.50. In the past, the supplier has participated in the funding, but they've been forced to cut back as a result of rising manufacturing and supply chain costs. The obvious solution is to reduce the discount amount, but that would result in a very visible price hike in the eyes of the consumers, resulting in churn to other chains in the very competitive grocery market. Desperately seeking another solution, the retailer examined the quantities purchased in individual baskets. They

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discovered that 80% of customers purchased 1-3 units, but the promotional expense incurred by those purchasing 4 or more units was very significant. In a single week, there were 150,000 units sold as the fourth or greater unit in a basket – resulting in \$225,000 of additional expense. A “limit” of 3 was placed on the number of items that may be purchased at the sale price. Customer penetration was substantially the same as the previous promotions, but the expense was controlled, without raising the price point for the consumer. Their success with this particular product motivated the retailer to implement limits on many other promotions. And with market basket insight, they are able to easily determine the optimal limit for each product.

## More Intelligent Merchandising and Marketing

### *Example 4 – Actuals more insightful than averages*

A discount retailer always knew that their average basket was \$8. This metric was easily measured and tracked using summarized sales numbers (by computing dollar sales divided by transactions). However, when they dug deeper into their detailed data, they discovered that there were very few \$8 baskets! In reality, there was a large representation of two very different types of shopping trips – those less than \$4, and greater than \$15. The “average” just served to obscure a good understanding of the nature of the typical shopping trips. Armed with a detailed understanding of which types of trips are prevalent in which stores, they are able to better strategize on merchandising and marketing.

### *Example 5 – Single SKU location analytics and profitability*

Upon further analysis of the \$4-or-less baskets, the retailer determined that there are certain products that are very often found in single-SKU baskets. Using the rationale that customers must be coming into the store specifically for these items, they were moved further into the store, forcing the customers to pass through many other product categories resulting in increased basket sizes from “impulse” items and other merchandise.

### *Example 6 – Planogram insights*

A large discount retailer noticed that sales of a particular category were more variable than expected from store to store. A closer examination revealed that the difference in category sales were somewhat correlated to a difference in store layout. The chain maintained stores with different types of planograms, and one of those planograms appeared to benefit this particular category. To fully understand what in the planogram could be causing this, they performed a product affinity analysis for the category, which shows the products often purchased together with the target product. It turns out that in the store with higher category sales, many of those sales occurred in baskets that also contained another associated product, which was physically located in the same vicinity.

### *Example 7 – Assortment effectiveness*

During a recent assortment planning effort, category managers were re-allocating space to make room for new product introductions in a particular category. At the time, the bulk of shelf space was assigned to Brands A, B and C – each receiving roughly the same amount of space. The traditional approach is to examine the sales volume of each brand to determine the best candidate for a reduction in shelf space or to be removed entirely from the assortment. However, that doesn’t tell the whole story. By looking at the detailed activity of shoppers over time, they determined that shoppers who buy Brand A are loyal to that premium brand – they rarely switch to another. On the other hand, Brands B and C experience a high degree of “switching” between themselves, and with other brands. Consequently, they decided to reduce the space

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assigned to B and C, with the logic that reduced visibility of those brands, or an increased risk of out-of-stocks, would not have a negative impact as would be the case with Brand A.

Similarly, such insight is extremely valuable to the product manufacturers/vendors, who stand to develop a better understanding of the brands they are really competing against.

## *Example 8 – Growing the Basket Size*

Retailers realize that increasing basket size is one of the most efficient ways to grow top line sales. Attracting new customers is challenging, but growing sales through existing customers is tantalizingly achievable. One grocery retailer analyzed their better customers and identified those that are spending a significant amount in the “center store” aisles, but not in the perishable departments. These customers are already visiting frequently to purchase their consumables, but are evidently going elsewhere to purchase their produce, bakery, meats, etc. The retailer developed a marketing program to communicate directly with this target group, encouraging them to realize the convenience of shopping the perishable departments in the same trip.

## *Example 9 – Shifting Consumer insights and key understandings*

In turbulent economic times, there are fundamental shifts in consumer behaviors. Some of these can be obvious to retailers from glancing at their sales summaries, but some may be difficult to ascertain. Retailers are currently reporting an increase in consumables sales as consumers are “eating out” less. At the same time, sales of frozen and freshly prepared meals may remain relatively stable. By examining the detailed customer data, it may be discovered that there are two distinct consumer groups exhibiting a change. Customers that previously purchased prepared meals are shifting to lower cost basic ingredients to prepare their own meals at home. The “higher-end” consumers that previously dined out are now purchasing prepared meals at the grocery store. The summarized sales figures for prepared meals were hiding this fundamental shift of two separate customer groups. There may be implications for the retailer, but this is especially important for the manufacturer of the prepared meals, who may modify the brand positioning and marketing accordingly.

## Store Operations

### *Example 10 – Cashier and Customer service efficiencies*

When the operational details of each transaction are retrieved from the POS along with the market basket data, individual cashier performance may be evaluated and improved upon. Cashiers that take a usually long time to process regular items, tenders, weight items, etc. are re-trained on their particular area of deficiency. And products whose barcodes don't scan well and must be manually keyed in are identified and reported to the supplier for correction.

### *Example 11 – Loss Prevention support*

An electronics retailer is experiencing higher than expected expense on its promotional programs where they mail high-value coupons to targeted groups of customers. By analyzing the detailed transactional data, it becomes apparent that some customers are abusing these coupons by duplicating and using them multiple times. Furthermore, certain cashiers are re-using them for their own purchases. The cashiers have been warned and in some extreme cases, the customers have been confronted. Retailers often employ a significant part-time workforce that is less-than loyal. Such abuses are reined in when there is awareness of such visibility into operations and a manner in which to hold employees accountable.

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## How to Make Sense of it All

When first obtaining the ability to objectively analyze their detailed data, retailers should validate what they think is happening. Some may have institutionalized beliefs about their operations that were established by gut feel or the crusty old merchandise buyer. Others may need to understand why their business is in an upturn or downturn and take appropriate action.

By adding item cost to the basket information, it becomes possible to calculate profitability of the basket. Gross margin by transaction is the best indicator to rank and understand the profitability of the basket but the components of margin, e.g., shrink, price changes, transportation, rebates and other such factors are required to see true margin, not just markup. Margin analysis may be harder to achieve depending on how the retailer captures data (i.e., if rebates are captured and recorded by class instead of item).

## System Characteristics Needed to Support Market Basket Analysis

### *Speed*

The true fact of all analysis, regardless of how we do it today, is that we just don't know what we are going to need to know tomorrow or next week! The true power of Market Basket Analysis is realized with the ability to perform ad-hoc analysis. And that requires an underlying technical architecture that is built for fast query speeds. There is a new breed of high-performance data warehousing technologies that makes this possible.

### *Scalability*

For retailers of all sizes, Market Basket transactions represent a large quantity of data, often millions of rows per day or week. Historical data should be retained in a database so trends, this year vs. last year vs. plan and similar analyses can be done. The storage of all this data at the disaggregate transaction level requires an extremely scalable database system.

### *Analytical Extensions*

Some data warehousing environments offer "analytical extensions" that push the boundary of the kinds of questions that can be asked of the data. Such capabilities enable users to go beyond the basic summarizations and measures that standard databases offer. For example, the analysis of consumers can be facilitated with time-series capabilities that enable the analyst to track their behavior forwards and backwards in time.

### *Data Integration*

The ability to integrate multiple datasets sourced from disparate systems is key to the success of such a system. Even if such a capability is not utilized during initial implementation, it is inevitable that over time, data feeds from various internal and external systems will need to be brought together. The database environment should therefore facilitate easy integration of additional data without a re-design.

## In Conclusion

Retail is a highly competitive environment. Gaining customer loyalty and wallet share takes a lot of analysis to understand the customer. Market Basket Analysis is an opportunity awaiting many retailers. Data are already being collected at the register, technology exists to facilitate the analysis and merchants are very motivated to take advantage to improve profits.

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Some retailers understand Market Basket Analysis and have institutionalized it in their processes. There is a great opportunity for others to do the same and doing so is key to understanding the changed consumer.

If you find yourself having a devil of a time analyzing, sorting, and synthesizing customer transaction data, give 1010data a call. We have a better way that is straightforward and ultra fast, yet remarkably affordable and flexible.

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**1010data** offers a revolutionary, high-performance, user-friendly, web-based service for analyzing and managing retail data. Our unique technology allows us to build and manage databases in a fraction of the usual time and at a fraction of the usual cost and allows customers to do analysis and research quickly and effectively.

For additional information, please refer to [www.1010data.com](http://www.1010data.com).

For a Market Basket Analysis ROI report and worksheet, or for sample Market Basket Analysis views (reports), descriptions and screenshots, please contact **1010data** at [info@1010data.com](mailto:info@1010data.com)