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Size Optimization Made Simple: Creating Omni-Channel and Supply Chain Efficiencies to Increase Consumer Satisfaction and Revenue

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ABSTRACT

Retailers and wholesalers invest heavily in technology, people, processes, and data to create relevant assortments across channels. While technology and vast amounts of data help localize assortments based on consumer preferences, product attributes, and store performance, it's impossible to complete the assortment planning process down to the most granular level of size. The ability to manage millions of size and store combinations is burdensome, not scalable, and not precise. Valuable time and effort is spent creating detailed, insightful assortments only to marginalize those assortments by applying corporate averages of size selling for the purchasing and distribution of sizes to locations. The result is missed opportunity: disappointed customers, lost revenue, and lost profitability due to missing sizes and markdowns on abundant sizes. This paper shows how retailers and wholesalers can transform historical sales data into true size demand and determine the optimal size demand profile to use in the purchasing and allocation of products. You do not need to be a data scientist, statistician, or hold a PhD to augment the business process with approachable analytics and optimization to yield game-changing results!

THE CHALLENGES OF POORLY OPTIMIZED ASSORTMENTS

Retailers today have invested a lot in technology, people, processes, and data to create relevant assortments across multiple channels.

The challenge of managing millions of size and store requirements has been daunting, and the results have not been readily scalable. While technology and vast amounts of data have helped create more localized assortments based on consumer preferences, product attributes and store performance, it's been nearly impossible to narrow the assortment planning process to the size level.

> "If your goal is to improve forecast accuracy, profitability and customer satisfaction across the merchandise planning chain, then you need to make sure that sizing plans are optimized to meet demand. Creating sizing plans based on averages will only achieve average results. Retailers need to move beyond averages by drilling into a store-by-store level that reveals who customers are in each location and what they are buying in their local stores."
>
> Joseph Skorupa, group editor-in-chief, RIS News

On the whole, the results have been imprecise. Many organizations spend lots of time and effort creating detailed and targeted assortments only to water down those assortments by applying corporate averages before the sizes are shipped to stores.

Some retailers get sizing right by location but miss seasonal opportunities where size demands are different. This inevitably leads to customer disappointment due to absent sizes. In addition, poor sell-through due to a lack of size optimization can inadvertently train customers to delay their purchase even when you have the right sizes because they know it will soon move to the markdown racks.

The problem intensifies with the introduction of packing configurations. Vendors often offer (or impose) certain pack configurations (case packs). While case packs increase supply chain efficiencies, they tend to fall short of meeting size-level demand. So when you combine these factors – store, size, and case packs – the mathematical possibilities for configurations to meet the demand are overwhelming.

THE REALITY OF MISSED OPPORTUNITIES

Two of the top challenges retailers currently face are reaching sales targets and investing in the right inventory. To meet these challenges, you need the ability to estimate actual customer size demand. Ordering and allocating too few of a particular size results in stock-outs and lost sales, while ordering or allocating too many leads to markdowns that affect profitability.

Simple solutions that seek to address these problems include offering customers free shipping of an item not available in the store. Not a bad tactic, but at what cost? What percentage of customers leave without making a purchase as a result of a size being out of stock? How are retailers capturing and measuring the lost potential?

Ideally, you should aim for localized size assortments that have these results:

- Sales, inventory productivity, and margin increases
- Interconnected assortment management and omni-channel strategies that follow through to allocation execution
- Easy-to-use solutions that fit within current organization and business processes
- A quick path to value and return on investment

Our solution is SAS® Size Optimization. It uses powerful analytics to transform historical sales data into size-demand intelligence. It generates demand-based size profiles by channel and location. The solution predicts future sales and inventory needs by size, and determines the best case-pack supply to meet demand.

When integrated with your existing systems, you can apply this intelligence to purchasing and allocation workflows. The result is optimal case-pack orders and allocations that satisfy each store's needs.

The solution accomplishes this level of planning and execution by matching packs to size-level demand for each store. The suite consists of two integrated products – SAS® Size Profiling and SAS® Pack Optimization – that enable retailers and wholesalers to automatically convert higher-level merchandise plans into optimized size- and pack-level recommendations for both pre-season orders and in-season allocations.

The products use a common data platform and analytical engine that can be fully integrated within your end-to-end merchandising process.

CONNECTING SIZES AND PACKS WITH ASSORTMENTS

SAS Size Optimization aligns to the assortment management process, giving you the ability to order and allocate the right sizes for each location and channel.

During the pre-season planning process, merchants and planners create financial plans by product category to achieve the company's strategic financial goals. They identify product trends and attributes that will drive the plan. At the same time, size profiling assessments are conducted for product categories and attributes that are most relevant to the planning periods for creating location-based, product-size demand profiles. The size demand profiles are then published in the SAS profile library for creating purchase orders and allocations.

When your pre-season plans are approved and the assortment plan is created, you select specific products based on the depth and breadth of demand that will meet the targets of the merchandise financial plan. SAS Size Optimization integrates with assortment planning solutions to eliminate having to manually enter information from the assortment plan (product, intended locations, and delivery periods). Based on these factors, SAS Size Optimization will automatically select all relevant size-demand profiles that meet the criteria and highlight the best match.

The business user can select the high-level variables (locations, how many units of a style or color, and so on) along with operational rules that must be considered. These rules typically include the following details:

- The number of acceptable pack configurations that can be built
- Whether multiple colors or styles can be packed together
- Whether cartons can be broken
- Minimum and maximum thresholds by location

The SAS Pack Optimization component provides the quantity to order by size and the recommended pack (and bulk) configurations and quantities. In addition, SAS Pack Optimization provides a size precision scorecard of how accurately each location matches the selected combination of pack configurations/bulk to the targeted units by size. (See figure 1.) This insight makes it easier for you to collaborate with vendors and manufacturers to create the recommended packs, which will save lost sales and unnecessary markdowns.

SAS provides the flexibility to generate different pack configurations for retailers' web business, which can have different supply chain requirements.

When the results are approved, the information is exportable to purchase order management systems that automate the purchase order entry process. The size profiles and pack configurations can also be integrated with allocation solutions to provide assortment management continuity from allocation through replenishment.

Can you benefit from a size optimization solution?

SAS Size Optimization is for any retailer and wholesaler that sells sized merchandise or stocks assorted products that are distributed together. Any organization that ships assorted merchandise to multiple locations should find the solution essential for optimizing shipment profiles.

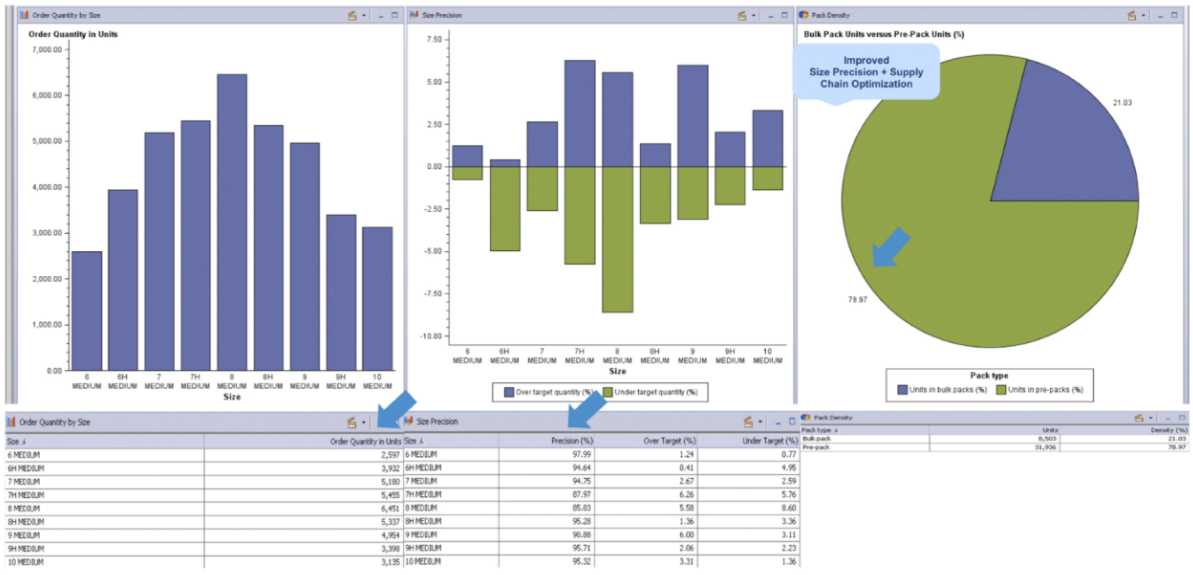

Figure 1: Size Precision Scorecard

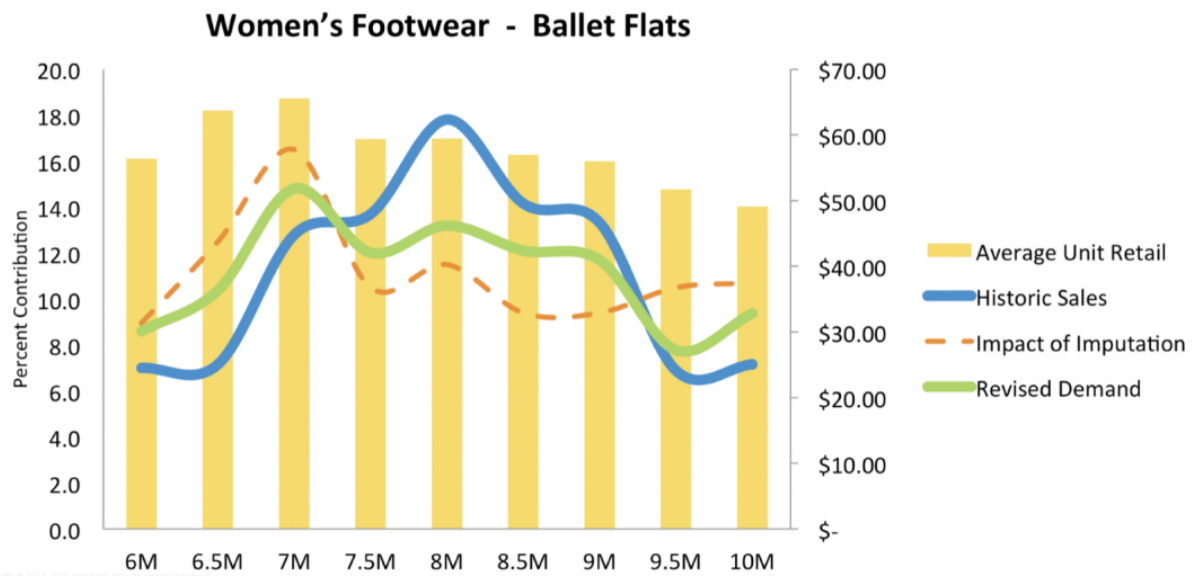

Figure 2: Size Profile Accounting for Impact of Lost Sales Due to Out-of-stocks

RETAILERS CANNOT LIVE ON A SINGLE SIZE PROFILE ALONE

Historical or filtered sales are not a proxy for actual size demand. Historical sales at regular price and promotion are a key performance indicator all retailers use to understand what's driving business; however, sales are only as strong as the supporting inventory. When inventory is constrained, stock-outs and lost sales occur.

While sales history is the primary source for the size-profiling process, there might not be enough useful data if there are significant stock-outs early in the season. In these cases, SAS® Analytics is used to estimate size, store, and weekly sales data that are either missing or constrained by supply. This enables you to determine the relative demand for a given item across its size range and, consequently, the value of the resulting size profile. (See figure 2.)

The SAS Size Profiling component will not provide recommendations for changing the quantity of the buy or allocation. Instead, it will recommend how to redistribute the allocation quantity by size to optimize financial results.

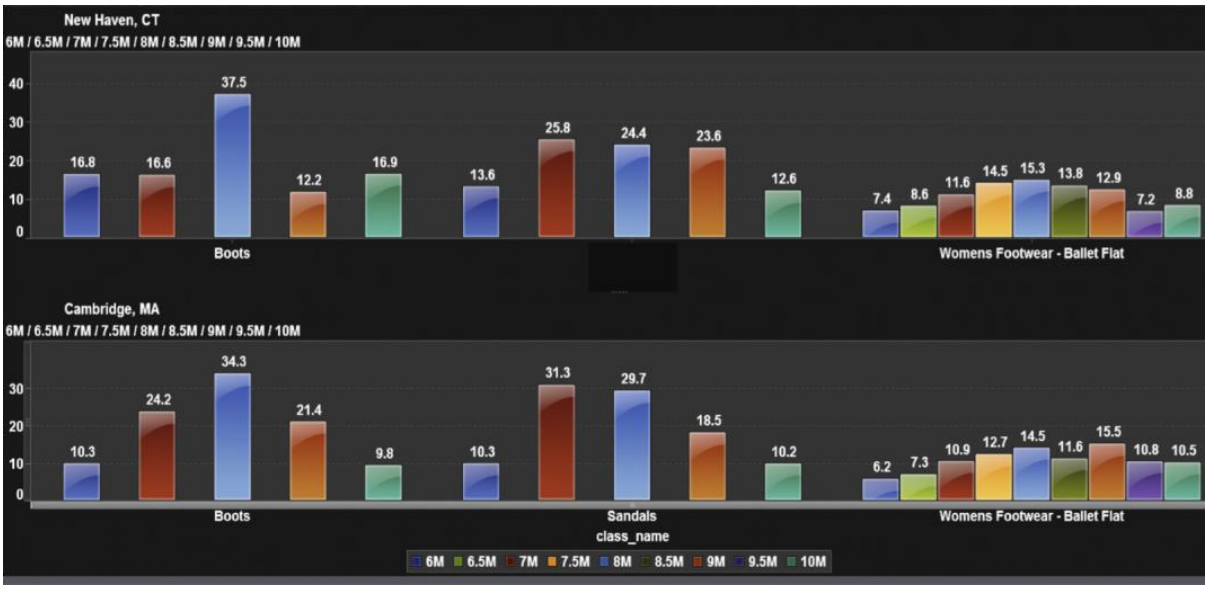

Figure 3: Size Profile Differences Due to Location

SIZE INTELLIGENCE THAT CAPTURES UNIQUENESS

Location

Retailers need to localize assortments to meet specific customer demand. Some accomplish this by analyzing sizes sold at several locations within a geographical radius and assigning a size profile to locations based on the resulting average size profile. Although better than assigning a national average size curve, it falls short of achieving precision.

Figure 3 represents size demand for women's footwear for two locations within close proximity in the northeastern US. Both locations are located near prestigious universities and share a similar customer base (including students who are fashion- and athletics-focused). You can see there are not only size demand differences by products between the two locations, but there are also differences in footwear style purchases between the locations.

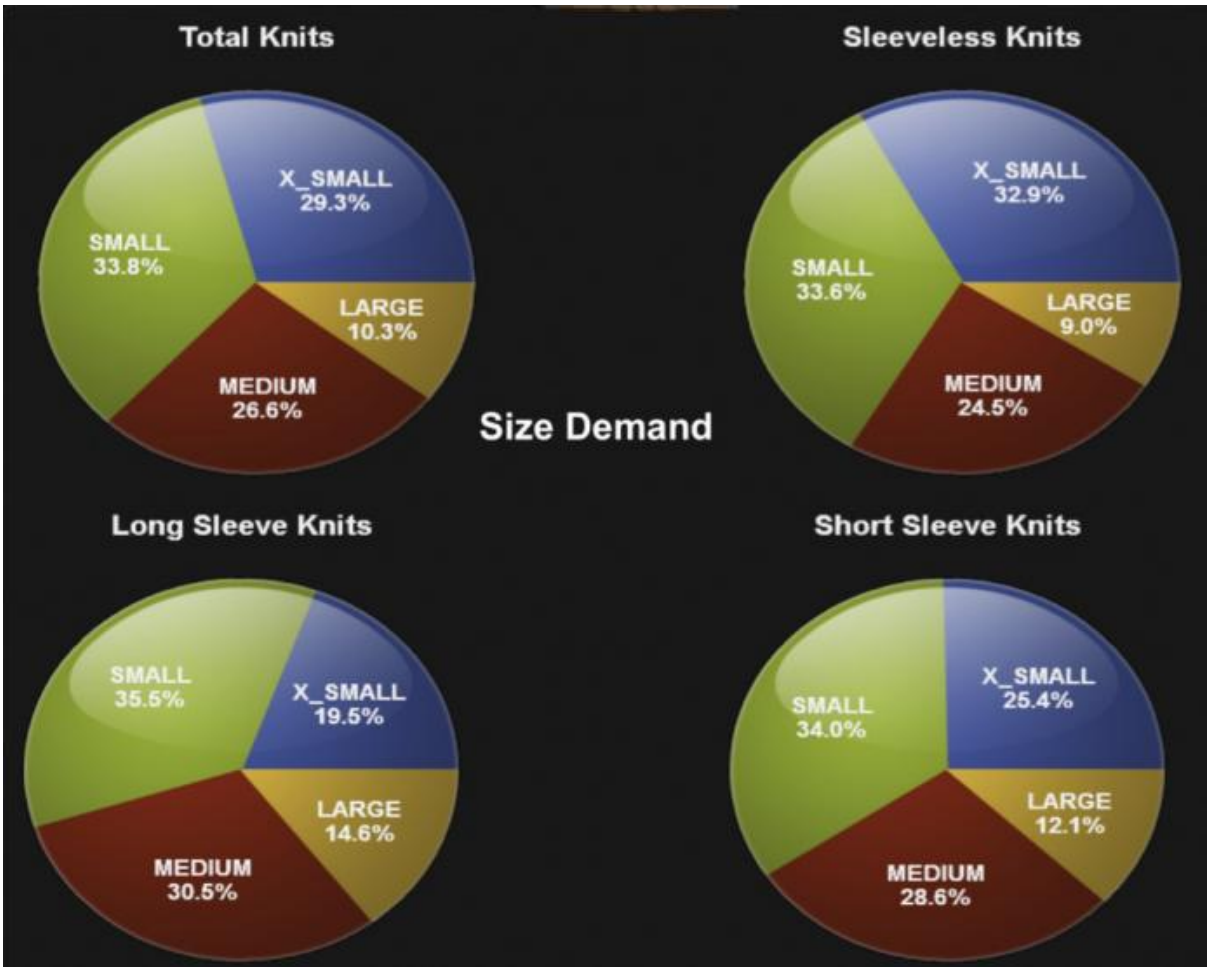

Figure 4: Size Demands by Attribute

The solution calculates precise size demand distributions at the location and product level. Using statistical clustering techniques, locations that share similar size demand patterns are then grouped together. The result is a sophisticated answer to the problem of distributing accurately sized merchandise to stores that achieves the right balance between size profile effectiveness and process simplicity.

Product

It is no longer good enough to purchase and allocate merchandise based on high-level performance trends. Figure 4 shows how size demands change at different levels within the product hierarchy and also between product attributes such as silhouette, fit, heel height, fabrication, and so on.

The buying team that purchases long-sleeve knits based on the size curve of the total knits purchased will be left with too many extra-smalls at the end of the season, creating unnecessary markdowns. A better choice would be sizes medium and large. Conversely, in the sleeveless knit category, demand for extra-smalls is significantly larger. SAS Size Profiling enables you to create high-level size profiles while the analytical engine mines data to create accurate size demand profiles that optimize the assortment plan buys.

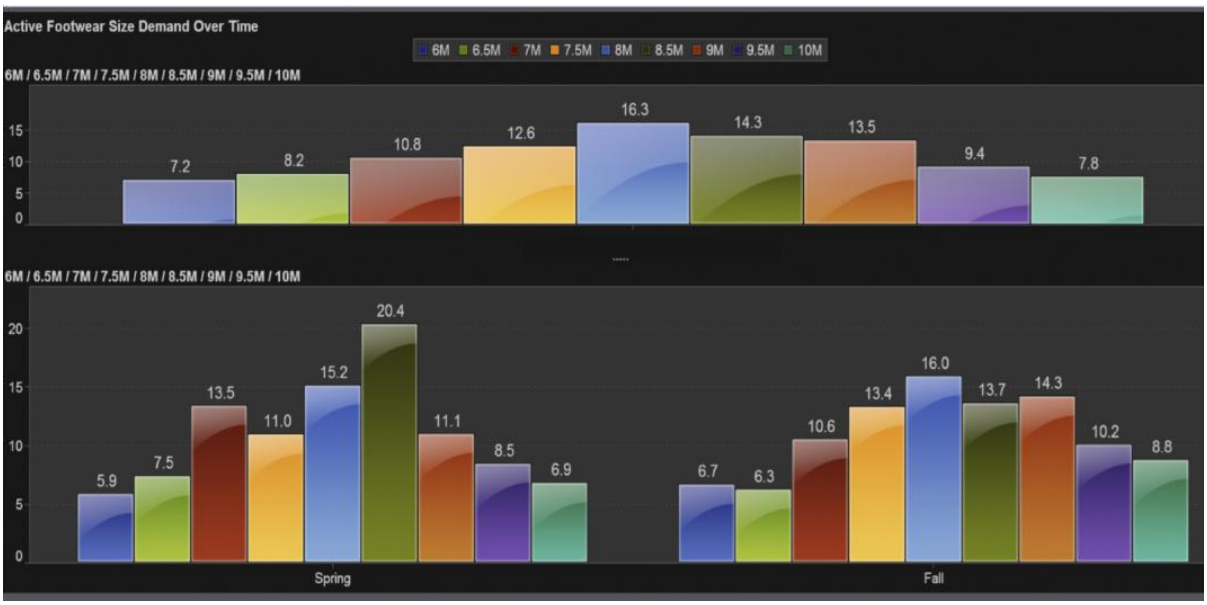

Figure 5: Size Demand Due to Seasonality

Seasonality

Good retailers anticipate seasonal peaks in their business and stock to meet increased projected sales, whether it is back to school, Mother's Day, Father's Day, religious holidays, and so on.

For example, a sporting goods retailer achieved significant improvements in sales and inventory turnover and had fewer markdowns as it began to create size profiles for seasonal peak periods. SAS Size Profiling provided the confirmation that demand in larger footwear sizes increased in the fall, especially in the fourth quarter. Store managers found this to make perfect sense. Customers were opting to purchase footwear a half size larger during this period to accommodate thicker socks due to the cooler temperatures. Before this insight from the data, the sporting goods retailer placed orders based on then-current size trends.

For example, if we look at the size 8.5 demand trend (see figure 5) and apply that to the spring buys, then stock-outs and lost sales would most likely occur during fall overstocks and markdowns.

SAS Size Optimization provides the flexibility to create seasonal size profiles that are the most relevant to their business to extract the greatest value. The solution detects and addresses conditions that would reduce the accuracy of analysis (such as out-of-stocks and inaccurate or missing data) so that if data collection processes are imperfect, you can still have confidence in the accuracy of results.

PUTTING IT ALL TOGETHER TO ACHIEVE REAL BENEFIT

OPTIMIZED CASE-PACK LEVEL PURCHASING RECOMMENDATIONS

SAS Pack Optimization converts style-level buys into optimized pack-level order recommendations. By selecting and applying the best available profile, the solution first determines size level store needs. It then considers the costs of overstock and missed sales to derive the most efficient combination of packs. The final recommendation, which can include multi-SKUs and bulk packs, is sent directly to a purchase order system. The result is a fully integrated path – from assortment style-level plan to size-level ordering.

SAS enables retailers and wholesalers to evolve from bulk ordering only to more advanced pack configurations (such as rainbow packs) and combinations of pack configurations and bulk.

SAS Pack Optimization uses an automatic size profile look-up and scoring to provide the best size-demand profile by location for the product and time period. Pack parameters inputs are applied to create the recommendations that balance size precision accuracy with supply chain constraints.

The example shown (see figure 6) is for a 20,000 unit order of a women's top in two colors. The processing cost per unit is $0.20 for bulk and $0.10 for case packs. The results show an improvement from bulk-only purchase orders to multi-style or color case packs (and the associated supply chain processing cost reduction) without sacrificing size precision by location. The results? Maximized sales, improved inventory productivity, and increased customer satisfaction. Operational efficiencies include getting the tops on the sales floor faster to begin selling sooner.

OPTIMIZED CASE-PACK LEVEL ALLOCATION RECOMMENDATIONS

SAS Pack Optimization integrates with allocation solutions to create comprehensive pack-level recommendations. It simultaneously considers all available packs; therefore, targeted inventory levels can be more consistently achieved while reducing handling costs. SAS Pack Optimization can account for various retail preferences such as minimum presentation quantities and can also incorporate size-level, on-hand, and on-order inventory data. This leads to fewer stock-outs, fewer markdowns, and lower operating costs.

The Benefits of Size Optimization

Businesses are using SAS Size Optimization to achieve these goals:

- Increase same-customer and same-store sales
- Calculate and reduce sales losses
- Improve margins through reduced markdowns
- Keep store inventory levels at a manageable level
- Increase customer loyalty and satisfaction
- Collaborate with vendors and suppliers on recommended pack configurations
- Improve the quality of assortment plan to determine how best to buy by size

Size optimization – not just for retailers

SAS Size Optimization is for wholesalers, too. You can transform historical sales data into size-demand intelligence for retailers' locations and channels or wholesale manufacturing and supplying retail orders – down to the size level. The solution predicts future sales and inventory needs and determines the optimal case pack supply to meet the demand. When integrated with existing merchant and supplier systems, it provides the intelligence for purchasing and allocation workflows.

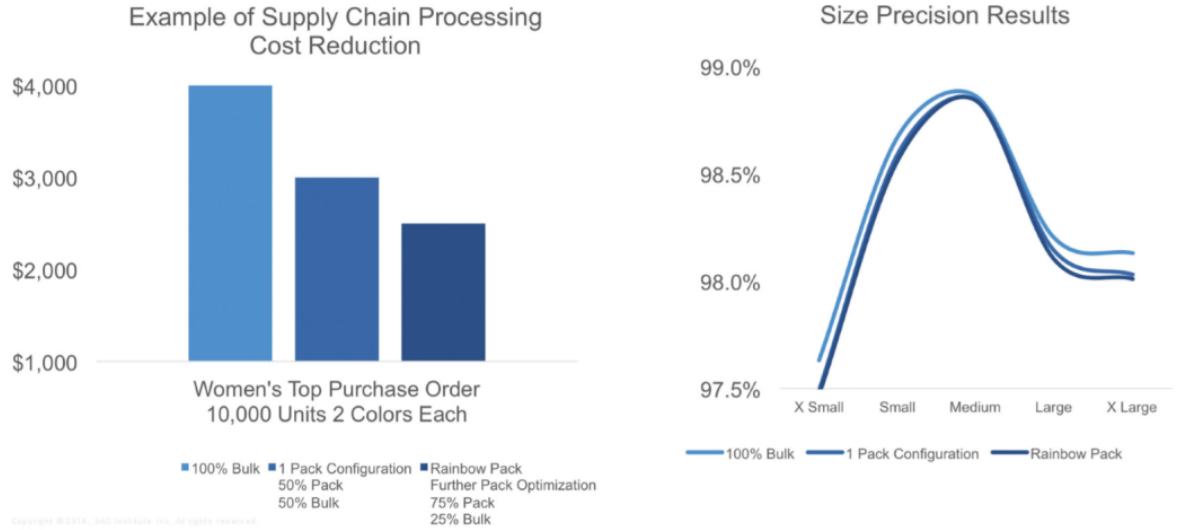

Figure 6: Operational Efficiencies Using SAS Pack Optimization

SIZE OPTIMIZATION SUCCESSES

- A specialty retailer found an immediate increase in its in-stock percentages once it began to use the SAS size profiles. As the initial orders built from the SAS size profiles arrived in stores, the retailer saw further improvements. When the retailer shared the improved results compared to the standard pack, a significant number of suppliers adopted the new configuration. For the suppliers, it also meant not having to offer markdown allowances or take unsold products back.
- A retail chain wanted to replace its in-house solution because it could not scale at the level needed to provide optimal pack configurations to all its stores. The goal was to reduce supply chain costs by being able to create effective packs to ship to stores. SAS Size Optimization has reduced purchase order creation from weeks to hours and minutes. Users have more time to spend on driving new business initiatives. This transformation was successful, in part because the SAS Pack Optimization engine has virtually no learning curve.
- An apparel retailer found significant improvement in overall gross margin, especially in fringe sizes, which had been a constant challenge. SAS Size Profiling revealed that the organization was buying the right number of smaller sizes, but those sizes were being sent to all locations instead of the stores where they were most needed. Once the company began to send smaller sizes where they were in greater demand, a significant increase in gross margin was achieved. On the other end of the size scale, the organization was finally able to identify the range of extended sizes needed for its web business and began to adjust its orders, resulting in net revenue increases while keeping inventory levels neutral.

> **Improved efficiencies**
>
> SAS uses automated processes and procedures through an easy-to-use workflow. This allows merchants, planners, and allocation analysts to play a more strategic role in the organization and put time back in their day to explore new business opportunities. The ability to apply supply chain constraints and settings optimally balances size precision and operating efficiencies prior to placing purchase orders.

- A vertical retailer found that by using the SAS size profiles earlier in the product production calendar it was able to more accurately determine fabric consumption and costing based on the product seasonal size demand profiles.

THE POWER OF ONE

How is success measured? Improved sales, inventory productivity, reduced markdowns, increased profitability, in-stock percentages, and customer satisfaction are just some of the ways. Let's look at how you can improve your business' size precision with the Power of One.

Suppose you are responsible for a $1 billion retail chain selling 40 million units a year. Consistently, you hear from the field personnel how stores immediately sell out of certain sizes of new items while they are left with too many units of other sizes. Interestingly, each store and district manager you hear from speaks of different sizes over- and under-stocked. At the company level, the merchant, planning, and allocation teams believe orders reflect the correct size ratios based on historical regular price sales.

What if the organization could move one unit of every 100 units sold out of the markdown category to the higher average unit retail prior to markdown? In this scenario there is an average unit retail price of $25, a 30 percent permanent markdown price point and 65 percent sell-through prior to markdown. The result is more than a $3 million net revenue increase.

In addition to achieving a quick financial return on investment, retailers gain additional benefits – such as freeing staff from time-consuming manual analysis so that it can focus on more valuable activities and new business initiatives.

SAS Size Optimization will identify the true size demand to create individual location and product-specific size profiles to improve the quality of the buys and allocation to meet customer size demand and achieve the power of one.

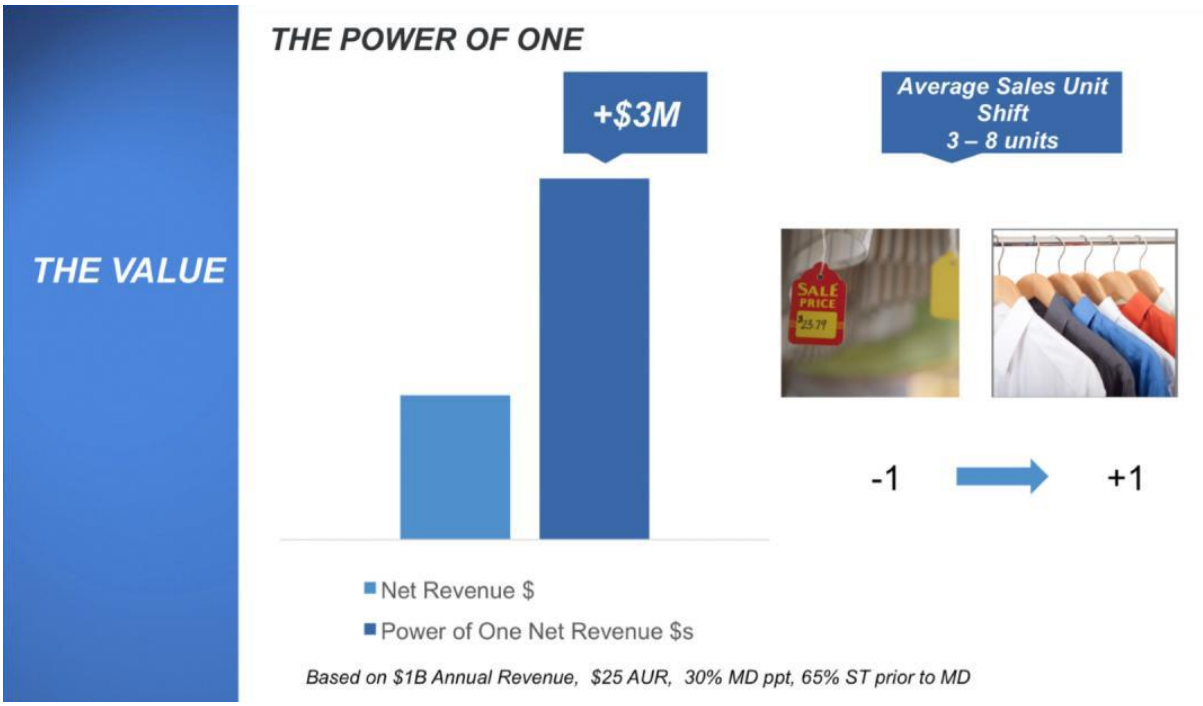

Figure 7: SAS Size Optimization Benefits

> *"Our out-of-stocks are fewer, our markdowns are fewer and our margins are higher – which, at the end of the day, is what every retailer wants. We were looking for a robust solution that was simple to use, and that's what we are seeing."*
>
> – Harris Mustafa, former Executive Vice President and Supply Chain Officer, DSW

CONCLUSION

If sizes are out of stock, you forfeit the sale and disappoint (and potentially lose) customers. And marking down overstocked merchandise reduces your profitability. The ability for you and your teams to truly optimize and localize assortments at the size level has been beyond your easy reach for too many years. Technology, and more specifically analytics, has evolved to enable retailers to successfully execute their omni-channel strategies to a level of precision and scalability not possible in the past.

SAS Size Optimization supports the final, most critical stages of the assortment planning process. The ability to understand true demand, not just sales history, provides retailers with the opportunity to better understand consumer behavior and create optimized profiles and pack recommendations based on the finer level of demand. The results include reducing stock-outs and margin erosion by having the right sizes in the right locations and increasing full price sales.

SAS Size Optimization effectively matches size-level demand with pack-level supply – for each store and merchandise category – improving the accuracy of purchase and allocation decisions to optimize assortments, improve omni-channel and supply chain efficiencies, and increase customer satisfaction and revenue growth.

CONTACT INFORMATION

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