

How to do ABC/XYZ Properly for Better Inventory Optimization

By Maarten Driessen & William van den Bremer

EXECUTIVE SUMMARY | Despite increasing pressure to reduce working capital across many industries, many multinationals still set their safety stock targets as a number of weeks of demand depending on an item's ABC/XYZ-segment, ignoring important aspects like lead time and replenishment quantities. This leaves room for improving costs, customer service and working capital. This article explains how to set up ABC/XYZ-segmentation in the right way and how to successfully implement inventory policies and service level differentiation in your organization. A real-life case study of a manufacturer of cargo securing systems is used to highlight best practices and the benefits gained.



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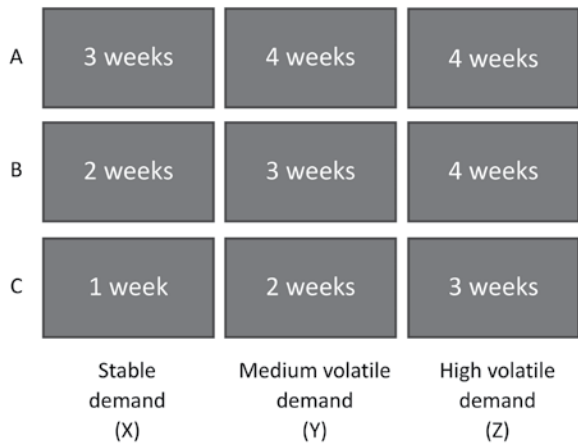
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Efficient inventory management is crucial for any business. While inventory is needed to meet customer service levels,

optimize operations and mitigate uncertainties, organizations often struggle to balance customer service levels, inventory costs, and cash

tied up in inventory. This challenge becomes even more complex when dealing with a broad portfolio of items with tens or even hundreds

Figure 1 | Traditional ABC/XYZ segmentation



of thousands of items. Defining the inventory policy, target service level and replenishment parameters like safety stock or reorder points on an item-by-item basis is a paramount yet time-consuming task. In this article we explain how we have successfully applied inventory policy and service level differentiation techniques, and how to avoid common mistakes.

THE VALUE-ADD OF INVENTORY POLICY & SERVICE LEVEL DIFFERENTIATION

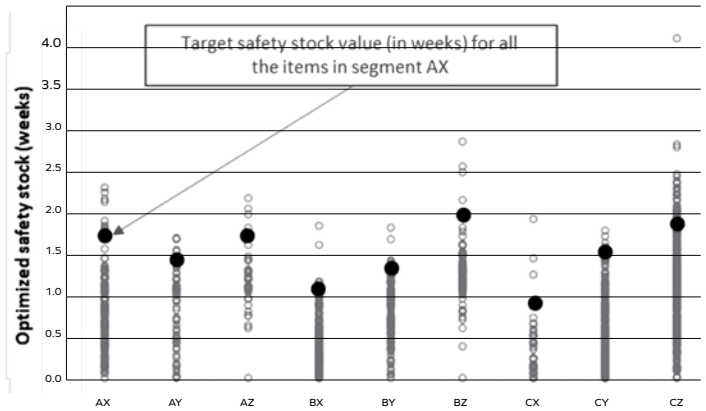
Striking the optimal balance between costs, customer service and cash is a complex matter. If all cost factors are known and customer service can be expressed in, for example, backorder or penalty costs, newsvendor equations can be used to find the optimal inventory targets (and ROI) per item and hence there is no need for segmentation. The reality is complicated though, as

often not all cost parameters are known. Segmentation is a powerful tool to group items with similar characteristics and apply the same inventory policy and service level target, rather than having to manage every item individually. The key challenge is to find a segmentation approach that is simple enough to manage while optimizing the performance of a given group of items.

WHY TRADITIONAL ABC/XYZ SEGMENTATION OFTEN FAILS FOR SAFETY STOCK MANAGEMENT

The traditional ABC/XYZ-segmentation classifies items according to their yearly demand volume or value (e.g. top 80% in A, next 15% in B and last 5% in C) and time period, e.g. a weekly or monthly demand coefficient of variation (XYZ). Practitioners still widely apply

Figure 2 | Suboptimal safety stock values using traditional ABC/XYZ segmentation



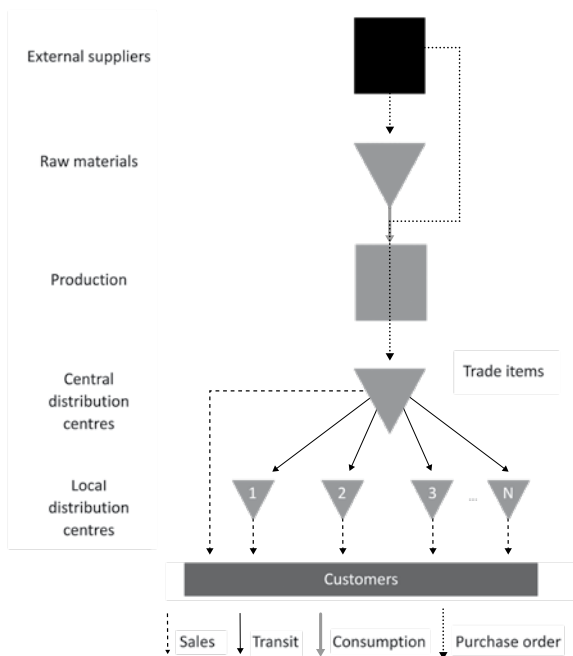
such segmentation to set their safety stock targets, typically expressed in a number of weeks as depicted in Figure 1.

The drawback of this approach is that it ignores how items in the same category can have different supply lead times, different supply lead time adherence, or different replenishment quantity. Figure 2 shows the spread in the optimal safety stocks (in weeks) per item (grey and white dots) and the target set per ABC/XYZ segment (solid black dots) for a real-life case. We can see, therefore, that traditional ABC/XYZ segmentation is not suitable for setting safety stock targets.

HOW ABC/XYZ CAN BE MADE TO WORK FOR SETTING SERVICE LEVEL TARGETS

Despite the abovementioned drawbacks, ABC/XYZ-segmentation can be a powerful tool as long as the following guidelines are taken into

Figure 3 | The production and distribution network in our case-study company



item’s demand and supply dynamics, for example XYZ can be based on the coefficient of variation of lead time demand. In this way, both the demand and lead time (average and variability) are covered.

CASE STUDY IN THE CARGO SECURING INDUSTRY

A global company that develops, produces, and sells solutions to secure and protect cargo loads during movement and transportation was able to realize an inventory value reduction of 20%. This was achieved by reducing excess stock, which was the result of a positive forecast bias. There was a desire to further reduce inventory, but also to set a direction and validate future working capital ambitions. We were tasked to assess their inventory health and to identify the best—yet realistic—way to reduce days of inventory without impacting customer service levels.

The company has three production sites and a diverse distribution network where products are shipped to end customers through global and local distribution centers (DCs) (see Figure 3). Production sites must focus on minimizing production disruptions and DCs must focus on customer service and turnover/margin. At the start of the project, safety stock targets were manually set per item/location.

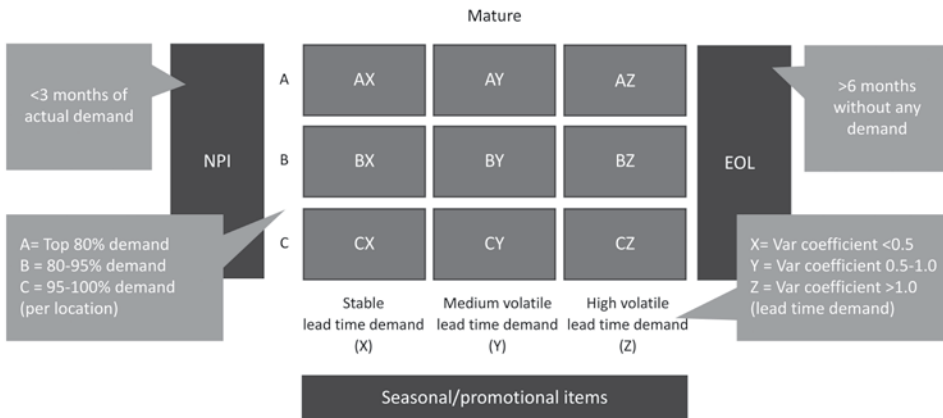
Figure 4 shows the implemented segmentation, based on the following rationale:

- Segmentation of products according to their life cycle: new product introductions, mature, end-of-life, and seasonal/promotional items,

account:

- Use ABC/XYZ-segmentation to differentiate inventory policies and service level targets, not for differentiating safety stock targets
- Apply ABC/XYZ-segmentation only to that part of the portfolio that has stationary (or trending) demand. Typically this part of the portfolio is responsible for roughly 80-90% of the total demand value. New and end-of-life items, as well as items with seasonal demand or high promotion pressure, are assigned to separate segments
- ABC should be tailored to item types and company targets, e.g. based on turnover or profit margin for finished products and based on demand frequency for raw materials. For spare parts it can be based on demand frequency, for example, divided by an item’s value. A one-size-fits-all approach is often not sufficient
- XYZ should be aligned with an

Figure 4 | The segmentation approach deployed at our case-study company



each having their own inventory policies. Mature items are further segmented into ABC/XYZ.

- Segmentation of items according to their importance (ABC):
 - Based on demand value for finished goods in DCs to align high margin products with high service levels
 - Based on demand frequency for raw materials in production sites to align high probability of production interruptions with high service levels
 - Made by location to avoid having items from larger locations (in terms of demand value/frequency) in A-category
- Segmentation of items according to their demand and supply dynamics:
 - Higher service levels are set for (X-)items, since required safety stocks are relatively low and their obsolescence risk is limited due to the relatively stable demand pattern
 - Based on the coefficient of variation of lead time demand which includes demand as well as supply variations.

Note that the ABC/XYZ-segmentation for the central DCs is based on total demand, i.e. both direct customer demand as well as transits to local DCs. This simpler, single-echelon optimization approach was chosen because the savings projected from including the ratio between these two demand streams into the segmentation at the central DCs were small

and didn't outweigh the complexity of their implementation.

The project to right-size safety stocks resulted in a reduction in safety stock of 10% (around a 5% total stock value reduction). At the same time, the service level increased from 91% to 95% on semi-finished products at both central and local DCs and from 97% to 99% for raw materials. The safety stocks at the local DCs could be decreased by 20% whilst increasing the aggregate service level from 96.7% to 98.1%, mostly through increasing the service levels in the A-category.

SUCCESS FACTORS

Strong collaboration with the client led to a step up in their knowledge and capability. The insights generated in the project led to an informed stock value reduction and improved service levels. The improvements however would not have been achieved without:

- 1. Identifying and realizing quick wins:** If project stakeholders don't see tangible benefits during the project, their involvement and support decreases quickly and turns into resistance.
- 2. Using data to support our proposals:** A proposed safety stock decrease of 20 units, for example, is more easily accepted by Planners if data show that the on-hand stock never fell below 20 units in the last year.
- 3. Growing the number of segments**

according to Planner capability: Increasing the number of segments to further differentiate inventory policies adds more value, but only if the Planners can handle the increase in complexity. We increased segmentation in line with Planners' ability to handle it.

4. Cleaning input data to truly reflect the business: Using data that reflects the actual business situation is imperative for reaching consensus and acceptance of the Planners.

5. Accepting that Planners occasionally deviate from the safety stock: If an item's cleaned data is not representative of the future due to *ad hoc* events, put the item on an exception list and monitor the exceptions carefully in the upcoming periods.

CONCLUSION

Businesses can substantially benefit from ABC/XYZ-segmentation, if correctly implemented. It differentiates inventory policies and service level targets and, as such, right-sizes safety stocks across the portfolio and network. By taking a holistic approach, leveraging data-driven insights, and increasing Planners' understanding of the company's supply chain dynamics, organizations can improve their customer service levels, inventory costs, and cash without starting a more complex multi-echelon inventory optimization project.

—Send comments to JBF@ibf.org