An introduction to inventory optimization

How to optimize your inventory management
to improve profitability and competitiveness

Content

Staying competitive in an ever-changing marketplace

Businesses that want to grow and maintain profitability have a lot to think about. Regardless of their industry, supply chain position, or geographical location, one thing is certain – competition is intensifying, and the ability to stay profitable is getting more challenging.

The global trading landscape is more uncertain than ever, with daily economic, political, and social changes. And technology is driving online purchasing, automation, and connectivity at a dramatic rate.

To stay competitive, many businesses are finding ways to cope with such dynamic marketplaces and high-risk environments while also striving to take advantage of opportunities. Some focus on enhancing their online user experience or investing in solutions to manage omnichannel sales and pricing.

To improve operational efficiency and supply chain transparency, others are modernizing their back-office systems, such as their enterprise resource planning (ERP) platforms.

Fewer, however, are looking at ways to ensure they have the right products in stock to meet customer demand. This strategic approach is known as 'inventory optimization', and it's being embraced across various industries, from automotive and energy to retail and electrical wholesale.

In this eGuide, we'll introduce the concept of inventory optimization and explain its fundamental theories.

The inventory optimization challenge

For many stock-holding businesses, having a robust supply chain is critical to meet market demand profitably.

At the heart of every good supply chain should be the practice of inventory optimization. Ensuring you have the right products in your warehouse to fulfill orders is critical to customer satisfaction and meeting revenue targets. While holding too much stock hurts working capital and profitability.

In this eGuide, we will:

Introduce you to the concept of inventory optimization

Delve into the importance of effective inventory optimization

Show you how to optimize your inventory processes using inventory optimization methodology

An introduction to inventory optimization

Inventory optimization is a relatively new concept and shouldn't be confused with basic inventory management processes.

Inventory management is the business process responsible for ordering, managing, storing, and moving inventory. As an element of supply chain management, inventory management supervises the flow of goods from manufacturers to warehouses and onto the relevant sales channels.

In contrast, inventory optimization is the art of balancing high service levels with the lowest possible inventory investment. It allows businesses to ensure product availability while reducing inventory costs and minimizing the risk of excess stock.

This is done by forecasting demand and managing supply variables while dynamically adjusting stock rules and inventory parameters.

Inventory optimization aims to have the right products in the right place at the right time – as efficiently and cost-effectively as possible.

While most ERP platforms and warehouse management systems (WMS) offer good inventory management functionality, only a few provide inventory optimization capabilities – which are rudimentary at best.

More and more stock-holding businesses are therefore turning to inventory optimization software that can be easily integrated with their existing ERP to offer a more advanced solution.

Complementing inventory management with inventory optimization is helping businesses improve competitiveness.

Here's how…

The importance of **effective** inventory optimization

Inventory optimization affects three fundamental areas of your business.

1. Product availability

Product availability is the number one success factor. When an order comes in, you must have the products in stock to keep customers happy and coming back time and again. Being out-of-stock can often lead to lost sales, not only of the out-of-stock item but also of associated items or complete 'baskets'.

With customers working to tight deadlines, more and more are demanding same or next day delivery. At the same time, businesses are expanding their sales channels to offer online ordering, adding a new layer of transparency across many industries. If you can't fulfill a customer's order because you're out of stock, it's easier than ever for them to find a competitor who will.

A simple stockout can lead to immediate and future lost sales, which can be avoided by ensuring stock availability.

2. Positive customer reviews and brand reputation

Consumers (B2C and B2B) are increasingly relying on the opinions of others before making a purchase. More than ever, buyers are turning to customer references and online reviews before committing to working with a business, signing a contract, or procuring goods.

Customer reviews are also closely linked to purchasing behavior because they influence customers exactly when they're actively looking to spend money (Forbes). Therefore, you must deliver a great customer experience that leads to a positive review and a positive impact on your brand.

Effective inventory optimization is the backbone to making this happen, as it ensures you have the products to keep customers happy, and you can deliver them to meet their service expectations.

3. Inventory optimization supports operational efficiency

Many businesses mistakenly think they need to carry excessive stock to reduce the risk of stockouts and poor service episodes. But while this may sound logical, here are three key reasons why this isn't the case.

1. Working capital
The more working capital you invest in stock sitting in a warehouse, the less you have for other business areas, such as running promotions or trialing new products. Too much cash tied up in inventory can also negatively impact a company's balance sheet.

2. Warehouse costs
Holding inventory costs money. The more you hold, the more warehouse space you need, which often comes at a cost premium.

3. Risk of excess and obsolete stock
If the stock you're holding doesn't sell, the excess can quickly turn obsolete. Selling off excess inventory usually involves heavy discounting, while obsolete stock may need to be written off altogether. Both scenarios will damage your profit margins.

In addition, with money tied up in excess inventory, you may lose the ability to adjust your stock portfolio to capitalize on market trends. Organizations, therefore, need a way to ensure product availability – without stock surpluses. The answer lies in inventory optimization.

Three stages to inventory optimization

01 | **Demand forecasting**

- Demand types and the product lifecycle

- Seasonality, trends and promotions

02 | **Stocking policies**

- Stock classification

- Multi-location inventory planning

03 | **Replenishment**

- Replenishment calculations

- Automatic daily order proposals

Demand forecasting

The first stage of inventory optimization is statistical demand forecasting.

It's very common for businesses (ERPs and WMS) to use a basic moving average formula to calculate demand forecasts:

$$\text{Future average demand per month} = \text{average demand over X months} \,/\, \text{X months}$$

However, this simple equation has many drawbacks. For starters, it only looks backward and does not consider future variables, such as seasonality or trends. It also fails to consider a product's place in the product lifecycle and consequential demand type. Both are critical factors in producing accurate forecasts and are central to forecasting when using inventory optimization methodology.

Let's look at these in a little more detail.

Demand types and the product lifecycle

Every item in your warehouse will move through its product lifecycle (from launch to growth, maturity, and decline). As they do so, the demand for each item will change, e.g., it will have a different demand type. For example, a product in its growth stage could have a high level of consistent demand, whereas a product reaching decline could have more volatile demand as sales drop off.
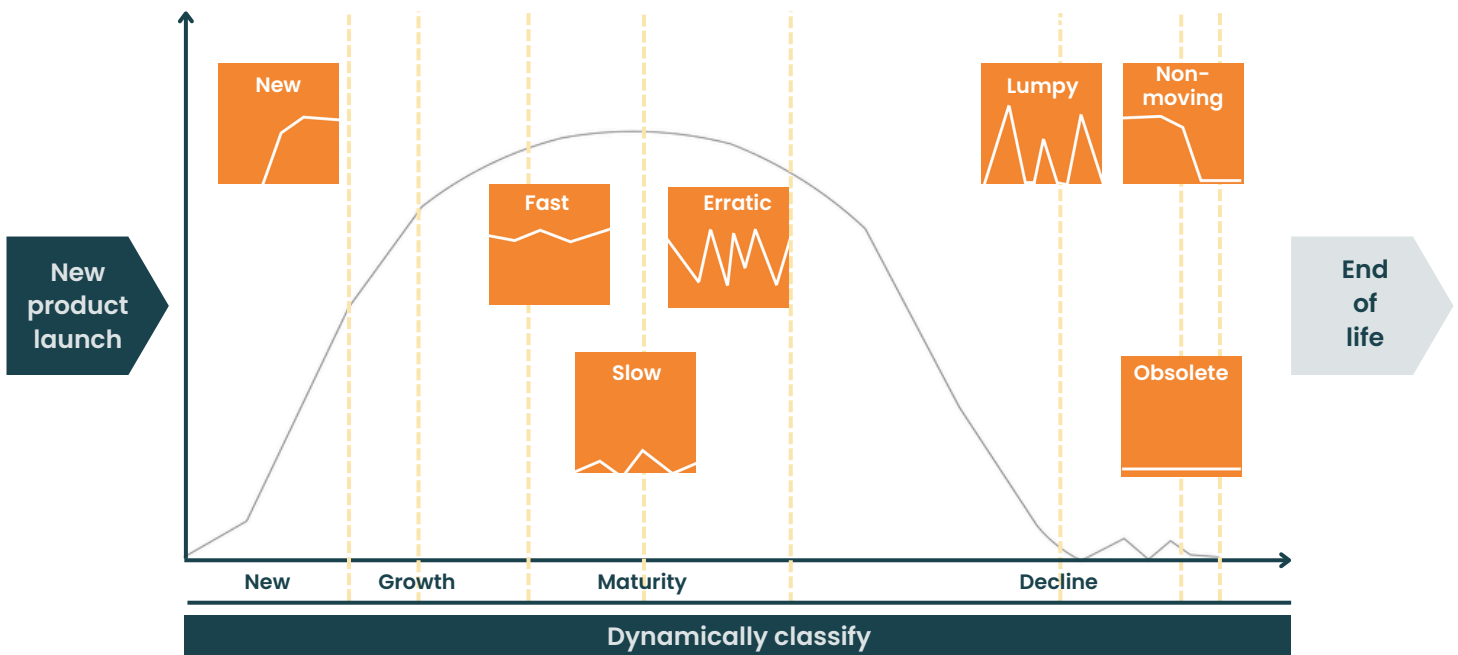

Diagram: Product lifecycle and demand types, as classified by EazyStock

Each demand type has a different deviation from its mean average demand, e.g., 'lumpy demand' rises and falls with lots of deviation from the mean, whereas 'fast demand' has a lot less deviation from the mean.

Demand types are important because they dictate the kind of statistical algorithm that should be used to forecast demand. For example, a different algorithm should be used to forecast demand for a product with 'lumpy demand' (moving average) to a product with 'fast demand' (double exponential smoothing).

By analyzing historical sales/demand data of each item in your warehouse, you can build a picture of their current demand type, group them accordingly and apply a suitable forecasting model.

Seasonality, trends and promotions

Seasonality, trends, and promotional activity all impact demand. With a base demand laid out, you should then consider:

Seasonality
By reviewing historical sales data, you can identify seasonal patterns and adjust forecasts accordingly. This helps prevent shortages during peak seasons and expensive surpluses as demand tails.

Trends
It's essential to understand the difference between a seasonal peak or trough (as above) and a rising or falling trend over time and adjust calculations accordingly to ensure forecast accuracy.

Promotions
Special offers, discounts, and long-term price drops all impact the overall demand for your products. These qualitative factors can easily be manually added to the forecast.

Statistical demand forecasting is critical to estimate future demand across all your sales channels accurately, so you can ensure product availability and help drive customer satisfaction.

You can also share this information with your suppliers, so they can improve their service to you and plan deliveries more strategically, again helping improve cost-efficiency and service levels.
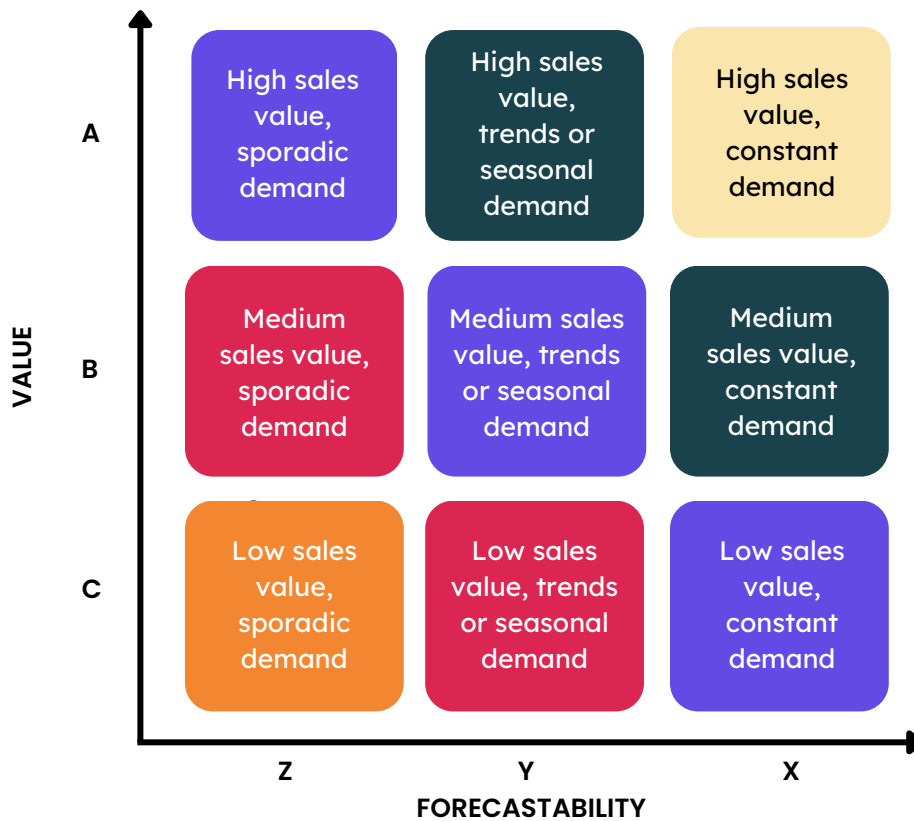
Stocking policies

Stocking policies

The second stage of inventory optimization is setting optimum stocking policies. The main objective of setting stocking rules is to prioritize the stock you carry, so you hold more of the items that are important to the business.

A simple inventory classification model, such as ABC analysis, will let you group products based on their value, so you stock more category 'A' items with a good profit margin versus 'C' items with less value to the business.

For a more sophisticated approach, XYZ analysis lets you segment items based on their value and demand variability, e.g., the likelihood that their demand will vary from their forecast.

The matrix shows a 3×3 grid with VALUE on the vertical axis (A, B, C) and FORECASTABILITY on the horizontal axis (Z, Y, X):

	Z	Y	X
A	High sales value, sporadic demand	High sales value, trends or seasonal demand	High sales value, constant demand
B	Medium sales value, sporadic demand	Medium sales value, trends or seasonal demand	Medium sales value, constant demand
C	Low sales value, sporadic demand	Low sales value, trends or seasonal demand	Low sales value, constant demand

Adding another level of insight allows you to make more informed ordering and stocking decisions. For example, treating AX items with constant demand differently from those with erratic demand (AZ items) makes sense.

With inventory optimization software, stock classification is even more advanced. For every SKU, EazyStock will account for its value annual usage (VAU) (unit cost x sales volume), demand volatility, and pick frequency (because it makes sense to treat frequently picked items differently from those picked rarely).

The result is an inventory policy matrix with 243 varying stocking rules.

You'll notice a percentage in each segment – this is a target service level KPI. The inventory optimization methodology works on the basis that every SKU is given a service level target. Service level is another term for 'product availability' and is the probability of not getting a stockout. It shows how well demand is being fulfilled.

Whether you use ABC analysis, the XYZ model, or your own inventory classification methodology, stocking rules allow you to set a service level target for each segment.

For example, high service levels are usually set for items picked more frequently and with a lower VAU. These would be stocked well, as they are cheap to stock and sell, and you want to ensure their availability. In contrast, you may not stock rarely picked high VAU items, fulfilling them to order instead.

Multi-location inventory planning

Finally, if you have more than one warehouse, it doesn't matter how well you optimize your inventory levels; if you store these items in the wrong locations, you're missing a trick.

Optimization is about distributing your inventory across your warehouses in the right quantities at the right times. You can then move items from regions where demand is low to those where it's higher. Products are then available to ship to local customers as quickly and cost-effectively as possible.

Setting intelligent stock rules and service levels will allow you to manage your warehouse, order more efficiently, and free up working capital for investment in other business areas.

Accurate replenishment
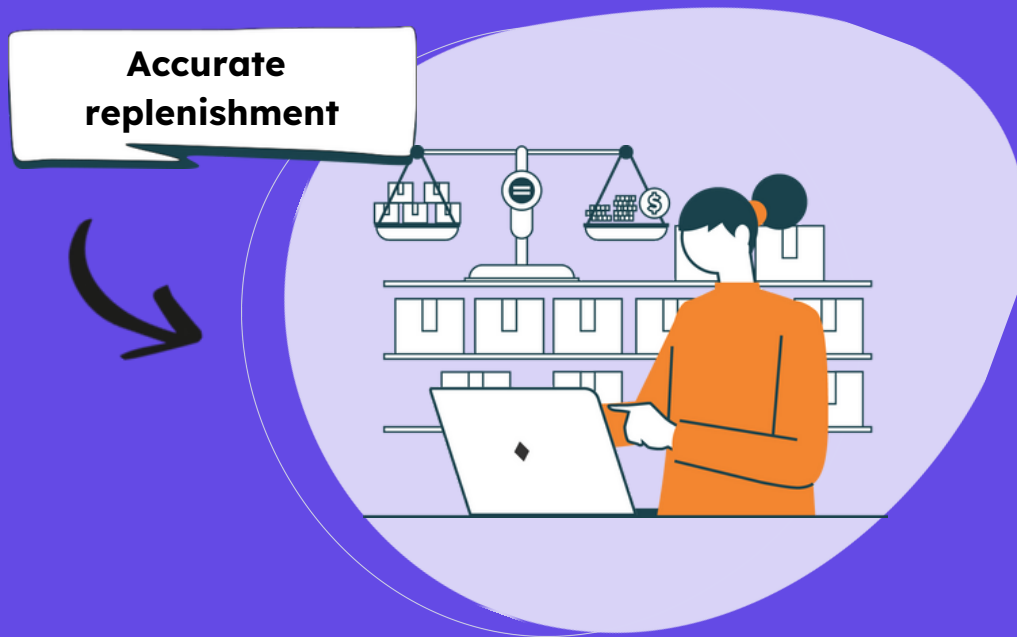
Accurate replenishment

With demand forecasting and stocking policies taken care of, the final part of the inventory optimization puzzle is optimizing your replenishment processes.

Central to any replenishment strategy is knowing how much stock to reorder and when to reorder it to meet demand most cost-effectively.

With your service level targets set, the next step is to calculate reorder points, reorder quantities, and sufficient safety stock levels to hit them and prevent stockouts.

It's common for many businesses to use rules-based, linear methodology for replenishment calculations – usually using spreadsheets or an ERP system to crunch the numbers. For example, inventory planners will reorder when they hit a fixed date or when stock drops to a specified level. The amount they reorder is usually either a fixed amount or variable to meet a minimum or maximum stock capacity. .

Unfortunately, rules-based calculations are a 'one size fits all' approach – and not all inventory items are the same! By definition, this approach will deliver the right amount of inventory for some items, too much inventory for others, and too little for others. Consequently, managers will simultaneously get stock imbalances that result in excessive inventory costs, impeded cash flow, and poor or inconsistent service levels.

Replenishment calculations are more dynamic when using inventory optimization methodology, and replenishment parameters are set by considering both demand and supply variables.

This means that safety stock (buffer stock) levels, reorder quantities, and reorder points are all set based on the following variables:

- Required service level targets – to meet your fulfillment targets without holding excess stock.

- Demand forecasts and demand types – to account for different demand types at different stages in a product's lifecycle, seasonality, trends, etc.

- Supplier lead times – to ensure enough safety stock to cover any variability in lead times. For example, during Chinese New Year, many Chinese manufacturers shut down production, which often causes significant supply disruptions for many western distributors because they fail to account for it in their replenishment planning.

- Cost-effective order quantities – to allow you to weigh up whether it's cheaper to buy in bulk with higher carrying and opportunity costs or aim for smaller regular reorders.

- Current stock levels, stock on order and in transit - for a complete overview of your stock levels, you also need to know what's on the way to your warehouse from your suppliers. This may seem obvious, but most systems don't have this information available in an easily retrievable way.

There are many complex inventory optimization formulas that you can use for replenishment calculations. However, these can get very challenging with only a spreadsheet as support. The alternative is to consider investing in inventory optimization software that automatically calculates each formula and saves you valuable time.

Systems like EazyStock automatically generate daily order proposals, providing a list of recommended items and quantities to reorder. You can then decide whether to review the orders (which you may do for high-priority items) or simply automate the ordering process (which you may do for faster-moving, low-value items where the risk of excess stock is low).

By optimizing your replenishment processes, you can be sure that you'll have the right products available to meet your expected demand while also carrying sufficient safety stock in case of unforeseen surprises. In addition, you'll be able to do so without the cost of holding excess inventory.
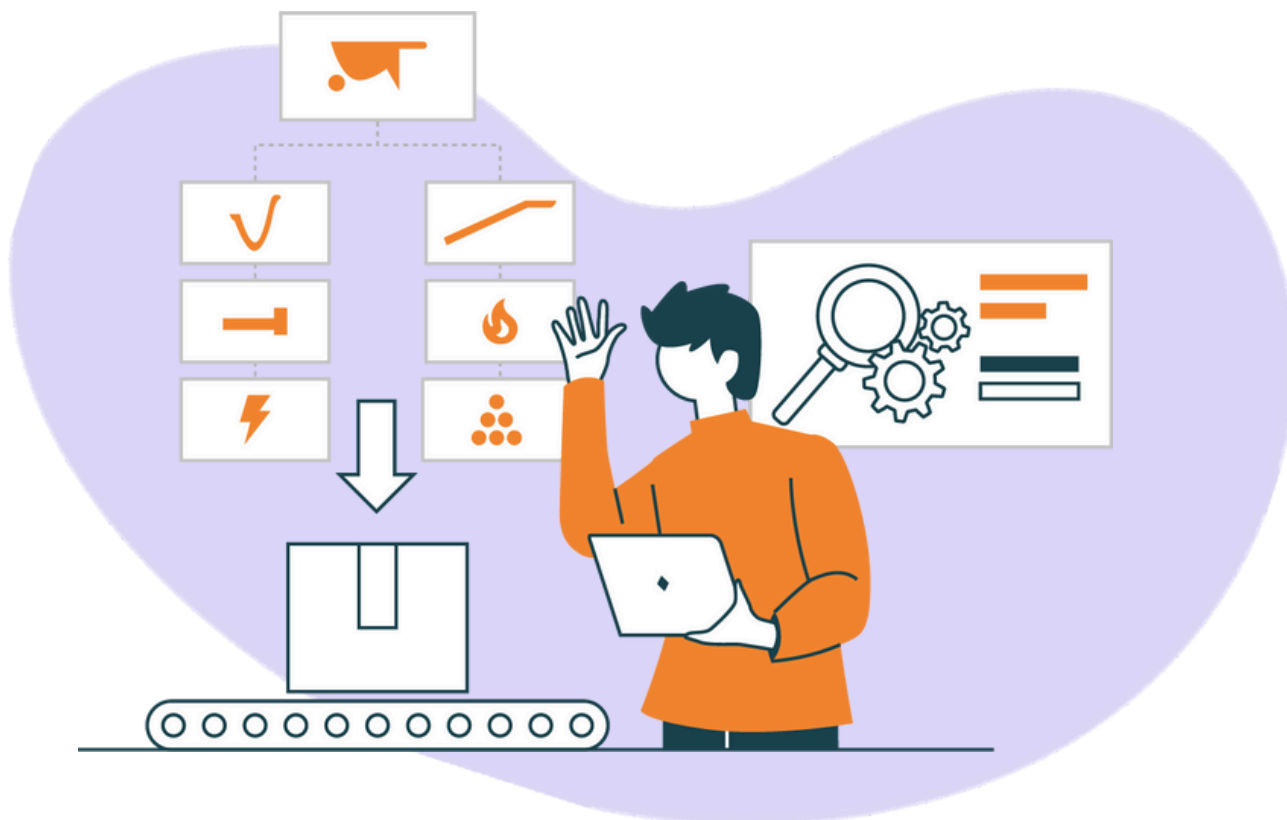
Inventory optimization in practice

More and more businesses are utilizing inventory optimization techniques to make their inventory management processes more efficient and cost-effective, ultimately making them more competitive in challenging marketplaces.

However, undertaking inventory optimization methodology without the right tools can prove complex and time-consuming, so consider using software systems to support it. While some ERPs and WMS can offer a basic level of inventory optimization functionality, investing in specialist inventory optimization software will ensure you have the best support for the job.

Connect, forecast, optimize and order.

Software like EazyStock is quick and easy to set up. It saves valuable time and resources, so inventory management teams have more time to analyze findings and make informed strategic decisions.

eazystock

Don't just manage your inventory, optimize it!

Connect, forecast, optimize and order. Having the right stock at the right time is easy, with EazyStock

Book a demo